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The Alberta Journal of Educational Research

Vol. VII, No. 1

March, 1961



THE COMMITTEE ON EDUCATIONAL RESEARCH

Faculty of Education
University of Alberta

ACKNOWLEDGMENT

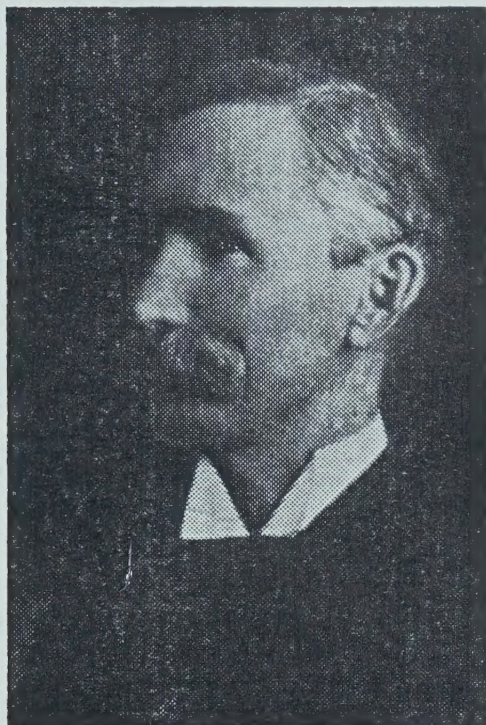


This publication was made possible by funds granted by the Carnegie Corporation of New York. The Corporation is not, however, the author, owner, publisher, or proprietor of this publication, and it is not to be understood as approving by virtue of its grant any of the statements made or views expressed herein.

THE CONTRIBUTIONS OF D. J. GOGGIN TO THE DEVELOPMENT OF EDUCATION IN THE NORTH-WEST TERRITORIES, 1893-1902

A. D. SELINGER

*Principal, W. R. Myers High School
Taber, Alberta*



D. J. GOGGIN

Introduction

The purpose of this study is to describe the work carried out by Dr. D. J. Goggin in his capacity as Superintendent of Education and Director of Normal Schools in the North-West Territories, and to assess his influence on the system of education which he directed during the period from April, 1893 to October, 1902.

It is hoped that this study will give recognition to an educator of this period of time and geographical area when a beginning system of education was being formed and shaped. The study also reveals many of the facts of the beginnings of present educational practices in Alberta. In filling this gap in Canadian educational history it is hoped that researchers will be encouraged to examine the careers of other outstanding western educationalists whose significant contributions to education are worthy of study and recognition.

The Pre-Goggin Period In N.W.T. Education . . . to 1892

Until 1875 education in the North-West Territories was carried on by missionaries working among the Indians. A modicum of success was achieved in settling some Indians as farmers, and, to a lesser degree, converting them to Christianity. (1) In 1875 state supported schools, really private schools receiving assistance from the Government, came into existence and in 1884 these schools also received support from direct taxation. Eventually, by 1892, the schools were almost totally supported by the Government.

Teacher training in the Territories was almost non-existent until provision was made to set up Normal training, conducted by Inspectors, in the Union Schools. These sessions were poorly attended because the training was not compulsory. However, provision had been made in the law for the appointment of a Normal School Director and the framework of a training system had been set up.

The previous authority in education, the Board of Education, was supplanted by the Council of Public Instruction under the provision of the Ordinance of 1892. (2) The Ordinance also provided for the appointment of a Superintendent of Education. A major change wrought by the Ordinance was the establishment of a unified school system in the territories which replaced the dual system which had existed prior to this time. Although the system of education was unified, religious minorities still had the right to establish separate schools supported by their members' taxes. The probable reason for the resolute attitude of the Territorial Assembly in bringing about this change was its determination to let nothing stand in the path of its chance to achieve the political autonomy for which it was striving.

The man who, in 1893, assumed the positions of Director of Normal Schools and Superintendent of Education was D. J. Goggin, formerly Principal of the Manitoba Normal School, and a noted educational expert in Manitoba and Ontario. The 'Who's Who' (3) of the day had this to say about Goggin's career prior to his arrival in Regina:

"Educationist, was born at Durham, Ontario, November 24, 1849, and after receiving a good public school education and obtaining a first class certificate, he for a time followed the vocation of a teacher. He was successively assistant in the Whitley High School, and Principal of the Millbrook and Port Hope Schools. He matriculated at University College, Toronto, and later, having been appointed Principal of the Manitoba Normal School entered the University of Manitoba. (B.A., 1887; M.A., 1890). In the following year Victoria University granted him the ad eundem degree of M.A. In 1893 he was offered and accepted the Office of Director of Teachers' Institutions in the North-West Territories, with entire charge of the educational system of the North-West Territories. While in Manitoba he was a member of the Council of Manitoba University, a member of

the Council of St. John's College, a member of the Advisory Board of Education, an examiner of the University and the Department of Education, and President of the Provincial Teachers' Association. In 1894 he served on the Dominion History Committee."

In 1900 Goggin was awarded an honorary D.C.L. degree by Trinity University and in 1901, having for a long time been an active member, he was elected President of the Dominion Education Association. His arrival in the Territories was well received by the public but with some uneasiness by certain members of the Assembly who noted that Goggin received a salary higher than that of the Premier of the Territories, and who feared further loss of control of the educational system by the Legislature of the North-West Territories.

Teacher Training And Certification

When teacher training was put upon a more formal basis in 1893 with the appointment of a Director of Normal School, and a non-professional certificate, upon the urging of Goggin, ceased to be valid as a teaching license, enrollment at Normal training sessions leaped. Goggin was highly critical of school boards who hired unqualified teachers because they could pay them a low salary or because such teachers adhered to the religious creed of school board members. About unqualified teachers Goggin said:

"Few of such teachers do more than keep school. They do not teach because they do not know how, and the children are the victims of their experiments." (4)

At first Goggin conducted the training sessions with only slight aid from Inspectors. However the course of studies at Normal School was gradually expanded and more staff members added. The course of studies resembled that of Manitoba, where Goggin had been Principal of the Normal School, which in turn was borrowed from Ontario where Goggin had been educated, trained, and had taught. Gradually the course of studies took on a character of its own with Goggin laying stress on the importance of "systematic and definite instruction" (5) in a course and thus emphasizing the value of subject matter. Emphasis also was placed upon practice teaching as well as upon absorbing the theory of teaching and its methodology. Before 1893 only 55 students had been trained at sessions held in Normal Schools in the Territories. Between 1893 and 1902 a total of 808 students was trained.

Although the Normal School, housed in its own building in 1895, did a commendable job in providing qualified teachers for the Territories, it could not keep up with the demand for such teachers. Accordingly, provisional teaching certificates were issued to partially qualified teachers. When the Council of Public Instruction was re-

placed by the Department of Education in 1901, certificates were designated interim or permanent.

To supplement the formal training received by teachers, Goggin set up teachers' Reading Courses, formalized teachers' Institutes and encouraged teachers' Conventions. Institutes and Conventions became so entrenched in the educational system, presumably because they were successful, that they exist to the present day throughout Western Canada in only a very slightly changed form.

Goggin, with the aid of his school Inspectors who acted as his eyes and ears, kept himself carefully informed on all aspects of education in the Territories. He defined an inspection as "observation and examination with a view of determining how far the school meets the needs of the pupils and the requirements of the State." (6) Goggin expected each Inspector to visit each school in his district at least once a year and the Inspectors not only managed this super-human feat but more. As a result of such diligence, whenever any part of the system of education was headed for trouble, Goggin was able to devise means to circumvent the problems. His activity and success in promoting better training for teachers indicate that he was a man of imagination as well as energy.

School Grants In The North West Territories, 1892-1902

The structure of school grants came under the influence of Dr. Goggin, just as every other aspect of education in the Territories was influenced by his thinking. Because Goggin was so vulnerable to attack in the Assembly and nothing aroused Assembly members to a high pitch of excitement more readily than a lowering of spending in their area or a general raise in taxes, the Superintendent was very discreet in his utterances on grants. Nevertheless, because of his close alliance with his admirer, Mr. Haultain, Premier of the North-West Territories, many changes in the grant structure reflect the general and specific educational thinking of Goggin.

The grant structure set up by the Ordinance of 1901 (7) remained in force, with only minor changes, until 1913. Perhaps it took that long before someone felt strong enough to assume the control relinquished by Goggin upon his resignation from his positions in the North-West Territories educational system.

Because of the influence of Goggin, grants became gradually tied up with the qualifications of teachers employed and the number of classrooms in operation. These factors remain basic in calculating school grants in the Province of Alberta today.

In the period 1892-1903 the population of the Territories grew steadily. At the same time grants increased but not in proportion

to the steadily rising school costs. The actual amount of grant per pupil declined. There was a gradual tendency, which Goggin approved, to shift the burden of financing schools from the shoulders of the Government to the local taxpayers. This trend has continued in Alberta although the taxpayers now complain that the burden is oppressive in view of the fact that local revenue is fixed since it derives almost solely from real property taxation.

Another trend which began in that period and continues until today, is the clearly marked preferential treatment received by rural areas in the appropriation of grants. This is probably due to the larger representation held by the rural areas in the Legislature but is offset to some extent, although this advantage is rapidly disappearing, by the concentration of industry in the urban areas and the consequent greater income derived from this source of taxation.

However one fact stands forth clearly and that is that the grant structure for this period of time was gradually altered so that the distribution of money was more equitable and enabled the rural areas to approximate the quality of education produced in urban areas.

But this was not Goggin's main objective in the distribution of school grants. He wished to use grant payments as a lever to encourage trustees to hire fully qualified teachers in their schools. Another of the Superintendent's motivations was to allow grant payments for pupil attendance since he felt regular attendance was necessary to the proper educational development of a child.

Some Goggin Views On Curriculum

Since Dr. Goggin held the position of Principal of Normal Schools and also was the Superintendent of Education and as such sat on the Board of Examiners, his influence reached into every area of education in the North-West Territories. Nowhere was the impact of his thinking felt more strongly or directly than in the area of curriculum. Over his years of leadership courses were revised, outlines made more detailed and, in general, the courses were made to conform closely to the educational thinking of Goggin.

That the courses of study prepared by Goggin were advanced for his day is evidenced by some of the comments made by others of his time. The London Journal of Education said:

"The North-West Territories have every educational difficulty to contend with . . . Nevertheless, this programme of Studies shows a progressive spirit nowhere excelled. The North-West Territories stands foremost among the colonies which insist on direct ethical teaching as part of the curriculum."
(8)

The Government of Great Britain published a lengthy fifty-five page synopsis of education in the Territories. In part, the Director wrote:

"May I take this opportunity of saying how warmly interested we are in the educational documents which you have issued for the North-West Territories of Canada. I have frequently heard them referred to here in terms of the warmest appreciation." (9)

The Commissioner of Education for the United States in a review of the system said:

"The Reports give evidence of advanced ideas with reference to the conditions for effective schools." (10)

The above comments do not constitute undue flattery or excessive praise when we recall that the curriculum of Goggin stood unchanged for a period of ten years after his resignation and that most of his ideas are readily accepted, with very few exceptions, by the majority of practicing teachers today.

Today, in a more complex world, few people would quarrel with Goggin's definition of the aims of education: prepare the pupil as a member of society to live a worthy life, and to earn a respectable living. But equally few would agree that these were the complete aims of education, nor could they agree on what all the aims really are.

The methods used in achieving these aims are more likely to stir up controversy today. The idea of mental discipline, so firmly accepted by Goggin and his associates, and which played such a vital part in shaping the curriculum, is today rejected by most professional educators if not by all parents. This, of course, was the theory which underlay the study of all subjects in Goggin's time, particularly the formal study of grammar.

Literature and reading were regarded by Goggin as vehicles for the transmission of the cultural heritage. This is evidenced by the fact that examinations of that period were composed of questions based directly on the material taught in the classes. Present examinations are in contrast to this practice in that emphasis is placed upon the ability of the students to read and interpret material which is new to them. However Goggin also regarded the teaching of literature and reading as a means of aiding the individual to apprehend the beautiful in life. This is a concept still widely accepted today as it was by the colleagues of Goggin. A notable difference of today lies in the modern tendency to include larger proportions of current selections in the courses whereas Goggin believed the bulk of a course should comprise the tried and true masters' works. Another concept rarely adhered to today is that content of a course shall be made as difficult as practicable since

such a course would afford students an opportunity to train themselves in logical thinking and because the sheer difficulty of a course would build the moral fibre of students in their efforts to overcome obstacles to understanding.

A seeming contradiction appears in Goggin's attitude toward the teaching of arithmetic and his attitude toward the teaching of geometry. In learning arithmetic, Goggin believed the student should memorize basic mathematical operations without regard to understanding and yet in the study of geometry he believed the student should gain an understanding of basic principles through experiencing the construction of geometrical forms. In nature study and geography he advocated the laboratory method of learning and emphasized the immense value of first-hand-experience. These are concepts, later advocated by Dewey, much in vogue today and held in high regard by educational psychologists.

As for his ideas on the direct teaching of virtue, so badly attempted by teachers in the "Manners and Morals" courses, our present "Health and Personal Development" courses have met with a similar lack of success as indicated by the tentative decision of the Department of Education to withdraw this course from the senior high school curriculum in 1961. By Goggin's own admission, this course was not a success in spite of the fact that he urged the teachers to act as living models of the practice of virtue before their students and to have students put into classroom practice the principles of virtue they learned. Perhaps the fault does not lie in the ideas but in the fact that our teachers and society are not ready to accept such concepts; on the other hand, perhaps teaching virtue directly to students in a classroom is just not a practicable idea.

Illustrations of the Progressive Thinking of Dr. D. J. Goggin

Dr. Goggin had many ideas on education which, for his day, were considered enlightened or advanced. These ideas he culled from his extensive reading and equally extensive and varied background in educational work. He believed that every student was entitled to a good education and that the qualified teacher was a chief factor in the provision of an education.

"The teacher is the main agent in producing a good school. It cannot rise above his level. Its improvement must come through his improvement, and that must come through wasteful experiments on children or through special training. In teaching, as in every other calling, the best results are accomplished by trained rather than untrained persons." (11)

Qualified teachers were produced by giving persons a broad, academic education followed by specialized training in the theory and methodology of teaching.

Examinations, in Goggin's opinion, did more harm than good in that they placed an adverse physiological and psychological strain on both students and teachers. In any event, examinations were not a reliable measure of a student's work. Together, a teacher and principal should decide when a student was ready for promotion, basing their judgment on the health, application to studies, and ability level of the student. Such a system would require the teacher to make constant evaluations of a pupil's progress, keep a principal informed, and require the student to apply himself steadily to his studies. Goggin also opposed homework for students because he felt it was an intrusion on the family time. He advocated all school work be done in the classroom where the student would acquire good work habits by working within set time limits, doing his own work, and receiving immediate assistance from teachers in surmounting problems.

Goggin's views on classroom control were particularly enlightened and humane for an era just emerging from the Victorian concept of absolute parental and adult control of minors. He believed a teacher should never enforce school rules without a rational motive for so doing. A child had to be led into acceptable social behaviour, not driven with harsh and non-understanding treatment. Self-discipline of the child was the objective of classroom control and this could not be achieved by a master-servant relationship in the classroom.

Undoubtedly other educational thinkers also held many of the views expressed by Goggin. Goggin differed from other educators however in that he was the administrative head of a system of education in a new territory. He held almost all the control, as Director of Normal Schools, Superintendent of Education and Chairman of the Examinations Board, of the entire educational system, subject only to the authority of the Legislature. As such he was in a position to put his ideas into effect since he was not hampered to any great extent by pre-conceived notions of others or by a tradition which had been successful in the past. That he did put his ideas into effect is indicated by the myriad specific changes which took place in the educational system of the Territories during his tenure in office and which conformed to his educational beliefs.

Concluding Observations

In his almost ten years of service in the educational system of the North-West Territories, Goggin succeeded in laying the basis of an educational system which was second to none on the North American Continent and which earned the respect and admiration of much of the civilized world of his time. Even after his retirement he made several visits back to speak to teachers' conventions and to

participate in disputes centering around educational problems. Nor did his resignation take him out of the educational field where he produced so fruitfully. From 1902 to 1907 he was literary manager of the Canadian Publishing Company in Toronto and in 1909 was appointed managing editor for the new Ontario school text books.

The exact reasons for his resignation are shrouded in mystery but in a letter to F. W. G. Haultain concerning his resignation Goggin gives his own estimate of his educational work in the North-West Territories.

"Early in October, for family and financial reasons, I asked permission to resign the Superintendency which I have held for nine years and a half.

The three-fold increase in schools and four fold increase in pupils, the establishment of the Normal School, Teachers' Institutes, Reading Classes and School Libraries, the improvement in the qualifications of teachers, the gradual elevation of the Course of Studies and the introduction of plans for the more equitable division of school grants are some of the important features that mark progress during this period. In higher educational ideas, in wider scholarship, in more humane discipline, in closer and kindlier relations between teachers and parents, and in ampler remuneration for teaching there has been steady advance. The full effect of these during this formative period of the Territories cannot be estimated now." (12)

A fair judgment of Goggin's career in education in the North-West Territories would be that almost single-handed he shaped the system from primitive beginnings and he was reasonably successful in achieving his goals. Even judged by the criteria of today, he was more than modestly successful as an educator.

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TEACHING WORK-STUDY SKILLS BY TELEVISION

ROBERT D. ARMSTRONG

Principal, University Practice School, Faculty of Education

The Problem

Educational television has been used in schools for about ten years. In this short time it has been the focus of much varied comment.

Some educators feel that television will have an almost revolutionary effect on education. Stoddard has quoted Dr. Thomas Clark Pollock of New York University as saying: "It now seems clear, however, that television offers the greatest opportunity for the advancement of education since the introduction of printing by movable type." (12:27)

The belief that educational television will have an important place in education has received some local support. The recent *Report of the Royal Commission on Education in Alberta* has both quoted and agreed with Stoddard saying, in part: "The use of television in the educational program . . . offers great hope for meeting teacher and building shortages but more important, for raising the level of teaching." (10:248).

Not all informed opinion, however, is so optimistic about the value of educational television as a teaching tool. Wischner and Scheier, for example, summed up their reactions as follows:

In the opinion of the present writers the relatively little research available, its character and findings, do not warrant the marked enthusiasm and overoptimism about educational television evidenced in many quarters. (19:613).

While television would seem to have a place in education, both its potential and the precise nature of its contribution are still in doubt.

Purpose

The present study attempts to report the results of an experiment in educational television carried out in March, 1958 at the Education Building, University of Alberta. The purpose of the experiment was to compare the effectiveness of teaching certain work-study skills to grade five and six pupils by closed-circuit television, with the effectiveness of teaching the same lessons by conventional classroom methods.

Related Studies

Studies in educational television have been of varying quality and are difficult to evaluate, particularly as reported by secondary sources. Holmes has stated two of the problems:

First, there is no analytical correlation of results of completed research and experimentation to date. Second, summaries of studies which are current do not relate the data to what has previously been established. (5:2).

A third difficulty seems to stem from the fact that television lessons are often produced by professional, commercial television producers rather than by educators. In many studies evaluation has been an afterthought and has been planned after the project was under way. Consequently, educational television projects have not sometimes been designed so that valid and impartial conclusions about their effectiveness can be drawn.

Evaluation of educational television has mainly been of two types: first, an analysis of test results from a controlled experimental situation using comparisons of performance of control and experimental groups; and second, evaluation by means of an analysis of the results of questionnaires answered by teachers and/or pupils. Both types have often been used for the same study.

Up to the time of the writing of the thesis, of which the present article is a summary, nine educational television studies had been carried out in Canada. All of them, with the exception of the present study, have been evaluated by the questionnaire method.

A combination of both types of evaluation has frequently been used in the United States: the effectiveness of a series of television lessons has often been measured experimentally, while questionnaires have provided lesson-by-lesson "feedback" so that individual television lessons might be modified as the series has progressed.

Canadian studies

Three national studies in the use of educational television have taken place in Canada, in 1954, in 1956, and in 1960. All three national studies were planned by the Advisory Council on School Broadcasting and the Canadian Broadcasting Corporation. The following conclusions, published by the Advisory Council after the second study, summarize the Council's attitude toward educational television:

1. Television has definite value as a teaching aid in the school classroom.
2. There should be the closest possible correlation between the content of school telecasts and the school curriculum.
3. Films and telecasts are complementary rather than rival teaching aids in the classroom.
4. Participation of classroom teachers in planning school telecasts is essential.
5. Teachers can also play a valuable role in the presentation of school telecasts of the 'master-teacher' type.

6. Where expense permits and the subject allows for it (e.g. in social studies) the employment of dramatized forms of presentations is justified.
7. Educational value is to be gained by presenting school telecasts in series. (11:22).

After the second national study in 1956, the study of educational television moved from the national to the provincial and local levels. The school boards in Scarborough and Halifax, and the departments of education in Manitoba and Alberta have all directed studies. Newfoundland used television during the 1959 polio outbreak as an emergency means of transmitting lessons to students while the schools were closed.

The Canadian studies have been concerned chiefly with providing experience in planning, producing, and teaching television lessons, with exploring practical problems of production and utilization, and with an investigation of the acceptability of television lessons by teachers. The Canadian studies have provided useful answers in these areas.

Studies from the United States

Many research studies have been published in the United States in the short time that television has been used in schools there. Research in television has centered in the United States partly because of the financial support of Ford Foundation's Fund for the Advancement of Education.

In 1954 the Fund made a grant to Pennsylvania State University to explore the effectiveness and practicability of television as a medium for teaching. Subsequently, research was carried out in many of the physical aspects of teaching by television. Some of the findings have been summarized as follows:

In twenty-nine out of thirty-two controlled comparisons in seven different courses, there were no significant differences in achievement between students taught via closed-circuit television and those taught in the conventional manner. (15:26).

The largest single experiment in the use of classroom television in a school district, once again assisted by grants from the Ford Foundation, took place in Hagerstown, Maryland. This experiment was a five year project to study the ways in which television might be used in a school system to improve instruction. Tentative findings, reported in March, 1959, indicated some success for the project. In comparing arithmetic achievement, for example, the median growth for the groups receiving television lessons was greater at all grade levels. The reports from Hagerstown are difficult to analyze, however, since gains rather than significant differences in achievement were reported. (13:3).

The most extensive experiment in the use of television in schools has been the National Program in the Use of Television in the Public Schools. From the beginning of the experiment in 1957, testing and evaluation have accompanied the broadcasts. Of 110 comparisons in eleven centers, sixty-eight comparisons favored the television students while forty-two favored the control groups. There were thirty-eight cases where the differences in achievement were statistically significant: in twenty-nine of these the differences were in favor of the television classes, while in nine cases the differences were in favor of the control classes. (15:54).

According to Holmes, approximately 90 per cent of the research studies show no significant differences between results of instruction by educational television and instruction by conventional means. Holmes has also stated that face-to-face interaction produced more positive changes in critical thinking ability and "group structure." (5:76).

Many questions about educational television have yet to be answered. Nevertheless, experimental evidence has shown television to be a teaching aid of some promise.

Experimental Design

Background

The closed-circuit television project of 1958 was jointly planned by representatives from the Department of Education, the University of Alberta, and the Edmonton Public School Board.

This experiment was part of a larger study in which ten lessons were taught. Four rooms in the Education Building, University of Alberta, were used in the experiment: the cameras in the studio, a converted lecture room, were connected by coaxial cable to receiving sets in a viewing room and in the classrooms occupied by grade five and grade six of the University School. Both classrooms were equipped with two television receiving sets with twenty-one inch screens, placed at eye level at opposite corners of the front of each classroom.

The experiment

Six lessons in the work-study skills were taught over a two-week period to three different groups at the grade five and six level. A grade five and a grade six class were chosen from each of University, Rutherford, and Parkallen Schools, making a total of six classes in all. The two classes at University School were taught by means of closed-circuit television; the classes at Rutherford School were taught by the television teacher but in the conventional manner;

and the classes at Parkallen School were taught by their own teachers. All classes used the same lesson plans, visual materials, and mimeographed follow-up activities.

The two control groups, the classes at Rutherford and Parkallen Schools, were used in an attempt to eliminate the quality of performance of the television teacher as a factor in the achievement of the television groups.

For convenience in this study, the University School classes are called the TV group, Rutherford classes the TVT group, and Parkallen classes the CT group.

A number of factors were considered to be of primary importance in predicting success in learning work-study skills: these were mental age, reading ability, listening ability, and initial ability in work-study skills. An initial testing program was carried out so that the predictor variables could be measured and, in cases where significant differences were found, final test results could be adjusted statistically to nullify initial advantage. A final testing program, consisting of a re-testing in work-study skills, was scheduled so that each class would be tested on the third day following its last lesson.

The television lessons were scheduled for Monday, Wednesday, and Friday during the first two weeks of March, 1958. The lessons were taught to each group so that no group would find the timing advantageous.

Two lessons were prepared on each of the following topics: map reading, reading graphs and tables, and knowledge and use of reference materials. The content of the lessons was determined by an analysis of the Iowa Tests of Basic Skills, Work-Study Skills section, the tests used in the experiment. Reference was also made to a recognized authority in the field of teaching the work-study skills. (1).

Tests

The mental ability of each pupil was determined by results obtained from the Laycock Mental Ability Test which, in Edmonton, was administered to each pupil in grade five in November.

The California Reading Test, Form CC, was used to measure each pupil's reading ability.

The Listening section of the Sequential Tests of Educational Progress was used to measure each pupil's listening ability.

The Iowa Test of Basic Skills, Work-Study Skills section, Forms 1 and 2, were used to measure initial and final ability in map reading, reading graphs and tables, and knowledge and use of reference materials.

Analysis of Data

The data gathered from test results were analyzed in three steps: (1) a comparison of initial test results was made to test the hypothesis that the three groups could be considered equal before the experiment; (2) a comparison of final test results was made to test the hypothesis that the three groups could be considered equal after the experiment; and (3) the gains made by each group were tested for significance to test the hypothesis that each group made significant gains as a result of the experiment.

Comparison of initial achievement

Initial test results are presented in Table I in the form of means and standard deviations.

Achievement of the grade five groups on the initial tests was very similar. According to Table II, only one of the twenty-one pairs of means tested by the "t" test showed a significant difference. None of the "F" ratios, resulting from the analysis of variance, was significant. (Table III). Accordingly, the grade five groups were considered to be equal at the beginning of the experiment.

Analysis of grade six initial tests results showed significant differences in three areas: mental age, and Test W-2 and Total of the Iowa Tests of Basic Skills. In those cases where significant differences were found, they seemed to correspond closely to the mean mental ages of the groups. Although not shown here, analysis of covariance confirmed the relationships between mental age and work-study skills achievement. Thus, while the grade six groups could not be considered equal on this basis of initial test scores, the results followed a pattern corresponding to the mean mental ages of the groups. (Tables I, II and III).

TABLE I
INITIAL TEST RESULTS

Tests	Grade Five						Grade Six					
	TV (27)*		TVT (30)*		CT (26)*		TV (26)*		TVT (27)*		CT (31)*	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
	146.63 107.74 273.33	12.83 11.42 9.86	141.60 100.30 272.80	16.37 14.69 8.38	142.85 104.81 273.38	15.32 13.79 9.75	163.19 114.42 280.00	15.80 9.21 8.14	152.78 110.59 277.22	12.48 10.86 7.24	155.39 111.90 279.19	16.87 11.37 10.26
Mental Age												
Reading												
Listening												
Iowa Tests of Basic Skills, Form 1, Test W-1: Map Reading	19.59	5.32	20.87	5.85	18.85	5.95	18.27	5.89	15.30	5.25	16.52	3.74
Test W-2: Reading Graphs and Tables	12.85	4.21	13.13	3.79	11.81	2.14	14.15	5.70	10.33	3.88	11.06	4.24
Test W-3: Knowledge and Use of Reference Materials	30.41 62.81	9.40 16.33	28.37 62.37	10.29 17.13	31.42 62.08	9.98 17.14	34.38 66.81	9.50 18.93	29.96 55.59	8.95 15.31	32.10 59.68	9.72 15.11
Total												

*Size of sample.

TABLE II
TESTS OF SIGNIFICANCE OF DIFFERENCES BETWEEN
MEANS OF GROUPS ON INITIAL TEST RESULTS

Tests	Grade Five			Grade Six		
	TV-TVT	TV-CT	TVT-CT	TV-TVT	TV-CT	TVT-CT
Mental Age	1.280	NSD	.293	2.665	5% (TV)	.661
Reading	2.120	5% (TV)	1.181	1.383	NSD	.447
Listening	.219	NSD	.240	1.318	NSD	.835
Iowa Test of Basic Skills, Form 1, Test W-1: Map Reading	.579	NSD	1.278	1.941	NSD	.953
Test W-2: Graphs and Tables	.264	NSD	1.571	2.821	1% (TV)	.682
Test W-3: Knowledge and Use of Reference Materials	.779	NSD	1.121	1.747	NSD	.718
Total	.009	NSD	.063	2.377	5% (TV)	1.023

TABLE III
ANALYSIS OF VARIANCE ON INITIAL TEST SCORES

Tests	Grade Five	Grade Six
	F	F
Mental Age	<1 NSD	3.35 5%
Reading	2.23 NSD	<1 NSD
Listening	<1 NDS	<1 NSD
Iowa Tests of Basic Skills, Form 1,		
Test W-1: Map Reading	<1 NSD	2.39 NSD
Test W-2: Reading Graphs and Tables	1.70 NSD	5.09 1%
Test W-3: Knowledge and Use of Reference		
Materials	<1 NSD	1.46 NSD
Total	<1 NSD	3.15 5%

Final test achievement

The analysis of final test data is presented in Tables IV, V, VI and VII.

The final test means of the three grade five groups were not significantly different according to the “t” tests. (Table V). There were no significant “F” ratios. (Table VI).

Grade six final test results showed significant differences that seemed to reflect initial advantage. Analysis of variance of gains seemed to confirm this fact. (Table VII). In addition, analysis of covariance, although not reported, showed that differences in final tests means could be accounted for in differences in initial test means.

It would seem that the methods used to teach both grade five and grade six groups had been of about equal effectiveness.

Significance of gains

The “t” test for significance of differences between correlated means was used to test the hypothesis that each group made significant gains. (Table VIII). The grade five groups all made significant gains on at least one of the Iowa sub-tests. All three grade six groups made significant gains on two sub-tests and the Total.

TABLE IV
FINAL TEST RESULTS

Tests	Grade Five						Grade Six					
	TV (27)*		TVT (30)*		CT (26)*		TV (26)*		TVT (27)*		CT (31)*	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Iowa Tests of Basic Skills, Form 2,												
Test W-1: Map Reading	19.41	4.68	20.57	5.33	20.04	3.88	22.92	5.68	18.59	5.35	21.00	4.51
Test W-2: Reading Graphs and Tables	14.48	4.88	13.66	4.33	13.85	4.25	16.27	5.06	13.78	4.74	14.58	4.27
Test W-3: Knowledge and Use of Reference Materials	30.74	9.41	28.53	10.60	30.54	9.88	34.58	10.57	29.56	9.43	32.39	9.33
Total	64.63	16.96	62.77	17.56	64.42	15.67	73.77	19.37	61.93	16.72	67.97	15.76

*Size of sample.

TABLE V
 "t" TESTS OF SIGNIFICANCE OF DIFFERENCES BETWEEN
 MEANS OF GROUPS ON FINAL TEST RESULTS

Tests	Grade Five			Grade Six		
	TV-TVT	TV-CT	TVT-CT	TV-TVT	TV-CT	TVT-CT
Iowa Tests of Basic Skills, Form 2,						
Test W-1: Reading Maps .....	.872 NSD	.534 NSD	.421 NSD	2.849 1% (TV)	1.412 NSD	1.085 NSD
Test W-2: Reading Graphs and Tables .....	.667 NSD	.500 NSD	.165 NSD	1.844 NSD	1.363 NSD	.678 NSD
Test W-3: Knowledge and Use of Reference Materials .....	.828 NSD	.075 NSD	.731 NSD	1.825 NSD	8.30 NSD	1.146 NSD
Total Test .....	.406 NSD	.047 NSD	.368 NSD	2.387 5% (TV)	1.247 NSD	1.415 NSD

TABLE VI
ANALYSIS OF VARIANCE OF FINAL TEST SCORES

Tests	Grade Five	Grade Six
	F	F
Iowa Test of Basic Skills, Form 2,		
Test W-1: Map Reading	<1 NSD	4.66 5%
Test W-2: Reading Graphs and Tables	<1 NSD	1.96 NSD
Test W-3: Knowledge and Use of Reference		
Materials	<1 NSD	1.77 NSD
Total Test	<1 NSD	3.12 5%

TABLE VII
ANALYSIS OF VARIANCE OF GAINS (FORM 2—FORM 1)

Tests	Grade Five	Grade Six
	F	F
Iowa Test of Basic Skills,		
Test W-1: Map Reading	<1 NSD	<1 NSD
Test W-2: Reading Graphs and Tables	1.37 NSD	1.41 NSD
Test W-3: Knowledge and Use of Reference		
Materials	<1 NSD	<1 NSD
Total Test	<1 NSD	<1 NSD

TABLE VIII
“t” TESTS FOR SIGNIFICANCE OF DIFFERENCES BETWEEN
MEANS OF INITIAL AND FINAL TESTS

Group	Grade Five				Grade Six			
	M ₂ -M ₁	σ _D	t	Sig.	M ₂ -M ₁	σ _D	t	Sig.
Iowa Tests of Basic Skills								
TV								
Test W-1: Map Reading	-.18	.22	7.41	1%	4.65	.23	20.22	1%
Test W-2: Reading Graphs and Tables	1.63	.22	7.41	1%	2.21	.29	7.31	1%
Test W-3: Knowledge and Use of Reference Materials	.33	.36	.92	NSD	.20	.45	.44	NSD
Total Test	1.82	.47	3.87	1%	6.96	.54	12.89	1%
TVT								
Test W-1	-.30	.21	2.52	1%	3.29	.29	11.34	1%
Test W-2	.53	.39	.41	NSD	3.45	.26	13.27	1%
Test W-3	.16	.46	.87	NSD	-.40	...	...	...
Total Test	.40			NSD	6.34	.51	12.43	1%
CT								
Test W-1	1.19	.48	2.48	1%	4.48	.17	26.35	1%
Test W-2	2.04	.42	4.74	1%	3.52	.19	18.53	1%
Test W-3	-.88	...	...	...	.29	.35	.83	NSD
Total Test	2.34	.54	4.33	1%	8.29	.57	14.54	1%

Findings

1. Initial achievement of the three grade five groups was approximately the same. Initial achievement of the three grade six groups was not the same but seemed to follow the pattern of their mean mental ages.

2. Final achievement of the three grade five groups was approximately the same. Final achievement of the three grade six groups seemed to correspond closely to their initial achievement.

3. All groups in both grade five and six made significant gains as a result of the six lessons in work-study skills.

4. The grade five and six groups taught by the classroom teachers showed the greatest gains, although differences in gains between these groups and the groups taught by the television teacher were not significant.

Limitations

1. The conclusions made as a result of the experimental part of this study are valid to the extent that the experimental design prevented a warping of evidence by uncontrolled factors, that the tests used measured what they purported to measure, and that the statistical methods used were effective in summarizing the test results.

2. No attempt was made to measure the novelty effect of television on the results of this experiment. It is possible that students watching the television lessons were motivated to an extent which could not be duplicated in a longer series of lessons, or in a series of television lessons which were not experimental in nature.

Conclusions

1. Under the conditions established in this experiment, grade five and six students learned work-study skills as well by means of television lessons as by classroom lessons.

2. Grade five and six pupils were able to make significant gains in achievement as a result of six lessons in work-study skills taught during a period of two weeks.

3. There was some evidence to suggest that the regular classroom teacher was somewhat more effective than the teacher new to the class.

Recommendations

As measured in this experiment, grade five and six students were able to learn work-study skills by means of television lessons. Many kinds of learning were not measured, however: concept de-

velopment, critical thinking, group participation, and oral and written expression are important areas which must be considered when estimating the total efficiency of instruction. It may be that television has a useful motivational effect which would make it a valuable supplement to classroom teaching, but the present experiment did not attempt to gather evidence to support this possibility.

Television would undoubtedly be useful as a means of instruction where no teacher was available, such as for correspondence students. Further evidence may show television to be an effective aid to classroom teaching. There did not seem to be sufficient evidence from this experiment or from other experiments to date to support or deny the exclusive use of television as a means for direct teaching.

Many questions about educational television remain to be answered. These questions can be answered only by the careful evaluation of experimental projects planned in the light of existing evidence. A number of areas for investigation are suggested by the present study:

1. The present experiment measured the immediate recall of information. What effect would teaching by television have on the retention of information such as that in the areas of the work-study skills?

2. The lessons taught as part of this experiment were rather more condensed and intensive than might normally be desirable. What would be the effect on learning of a longer series of television lessons?

3. The skill with which the television lessons are utilized by the classroom teacher is an important factor in their total effectiveness. How may the television lesson and the follow-up activities be structured so that maximum participation and effectiveness result?

4. The methods used by the television teacher in this experiment produced certain measured results. Would either modification of methods and techniques used or wholly different methods produce more desirable results?

5. The testing carried out in this experiment measured only a part of the learning which probably took place. What would be the effect of a series of television lessons on critical thinking, attitudes, or concept development?

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A STUDY OF DIVISION TWO SOCIAL STUDIES READING SKILLS

GEORGE R. HISLOP

The Problem

This study was part of a larger study conducted by the University of Alberta. The University experiment was a pilot study investigating the development of problem-solving skills at the division two level. Teaching techniques designed to give intensive training along problem-solving lines were used in the experimental classrooms. This smaller study attempted to explore the effects of the program of intensive training along problem-solving lines in one area—the use of social studies reading skills. It attempted also, to evaluate the transfer of improvement in the use of social studies reading skills on social studies problems to the use of these skills on reading problems of a social studies type without guiding questions.

Related Studies

An investigation of the curriculum guides, of writings by Russell (9, p. 237) and Fay (5) and a research by Leggitt (8, pp. 676-687) and Anderson (1, pp. 220-221) provided a number of social studies reading skills and suggested the importance of developing them. The term social studies reading skills means those skills that are necessary for solving a written social studies problem including skills in reading and interpreting written social studies material, in locating information and using information to solve a social studies problem.

Social studies reading skills are needed for problem-solving. They may be developed by a program of intensive training and their development may assist students in more than one subject area. In their research into the problem-solving processes of senior or college students, Buswell (4) and Bloom and Broder (3) found that successful students were superior in the use of study reading skills. Leggitt (8) found that systematic practice periods will develop these skills. Artley (2, p. 470) stated that "the social studies teacher who develops effectively the skills essential to adequate comprehension in his area probably will note a general improvement in other content fields." Further, Russell (9, pp. 175-176) listed ten ways in which every intermediate or upper grade teacher may give guidance in developing abilities most of which are useful in reading, arithmetic, science, social studies, health materials and

art materials. Apparently, improvement in the use of skills in one subject area will result in improvement in ability in a related subject area where these skills may be applied.

The methods used by Artley (2) in his study of reading comprehension, and Buswell (4) and Bloom and Broder (3) in their problem-solving investigations were examined. It was found that Artley used the scores from standardized tests to measure achievement in reading comprehension, whereas Bloom and Broder selected problems from College examinations to investigate problem-solving processes, and Buswell constructed problems to investigate the use of certain problem-solving abilities. Buswell and Bloom and Broder used the individual interview techniques to observe problem-solving processes, and in the Bloom and Broder investigation the interviewers made written records of the verbalized responses of the pupils. Apparently, statistical refinements cannot be used in reporting the findings of an investigation into reading and thinking processes. Buswell reported his findings in tables and Bloom and Broder used verbal descriptions. However, Bloom and Broder developed a check-list to record the oral responses to problems made by the pupils during the interviews. It was felt that these procedures could be adapted to an investigation into the use of social studies reading skills at the division two level.

Selection of Pupils

For this investigation, sixty division two pupils were selected from the experiment and control classrooms of the University of Alberta experiment in the development of problem-solving skills. Early in February 1958, the S.T.E.P. (10) tests of social studies and of reading, forms 4A and 4B, were administered to all the pupils of the University study. On the basis of scores made on the S.T.E.P. test of reading five high and five low achievers were selected from each of the three grades in the experimental and control classrooms. Thus there were fifteen high and fifteen low achievers from the experimental schools, and fifteen high and fifteen low achievers from the control schools, or a total of sixty pupils. The pupils from the experimental classrooms were paired with pupils from the control classrooms on the basis of scores made on the S.T.E.P. test of reading. The S.T.E.P. test of reading is designed to assess pupils' ability to understand and interpret printed material. Thus the pupils were equated in their ability to use a fundamental skill.

From February until June all the pupils in the experimental classrooms of the University study received intensive training in problem-solving. Various models, materials, and techniques were employed by the teachers (6, pp. 167-168). In June, pupils from

experimental and control classrooms were again tested. Alternate forms of the S.T.E.P. tests of social studies and reading were used. It was found that three pupils selected for the smaller investigation into the use of social studies reading skills had moved and were no longer available. Fortunately, two were a matched pair from the low achievers in grade four. The other was a grade five high achiever from an experimental class. Her partner in the control class was dropped. This reduced the number of pupils in this investigation to fifty-six, fourteen pairs of high achievers and fourteen pairs of low achievers.

Tests and Problems

To investigate growth in the ability to use social studies reading skills, it was decided to use a combination of a standardized test, the S.T.E.P. test of social studies; problems selected from the S.T.E.P. test of social studies; and problems developed especially for use in the study. The problems selected from the S.T.E.P. test of social studies and problems developed especially for the study were used in individual interviews, where records were made of the problem-solving processes of the pupils. The scores from the S.T.E.P. test of social studies revealed the results obtained by using social studies reading skills on a standardized test; written records of the verbalized responses of the pupils during the interviews gave insight into the use of social studies reading skills on a standardized test, on social studies material in a practical school situation, and on a social studies type problem with content not taken from the social studies field.

To observe the processes used to solve problems on a standardized test twenty-seven questions from Form 4A, and a corresponding twenty-seven questions from Form 4B of the S.T.E.P. test of social studies were selected. These questions required the ability to understand a problem, to interpret maps and other pictorial material, to select and interpret data, to draw conclusions, and to locate information in books.

Two problems with equivalents for later testing were developed in an attempt to study further the problem-solving skills used by these pupils in a practical school situation. One problem was designed to test the pupil's ability to use the library, and to plan a report to a larger group. The second problem was taken from Part II of the Wrightstone Test of Critical Thinking in the Social Studies in Grades Four, Five and Six (12) and adapted for use in this study. The problem consisted of a paragraph followed by four statements to be marked as proven true or false or not proven by

the facts stated in the paragraph. The statements were changed to questions that would require the pupils to phrase an answer.

To evaluate growth in the ability to use social studies reading skills on problems of a social studies type a pair of problems, one for initial testing and one for final testing, was devised. The pupil was asked to solve a problem of non-social studies content but was not given guiding questions. This part of the testing was designed to investigate transfer of growth in the ability to use social studies reading skills from social studies problems to non-social studies problems.

Procedure

The February and the June scores on the S.T.E.P. test of social studies by the pupils selected for this study were obtained from the person in charge of the University study.

The initial interviews took place in February a few days after the S.T.E.P. tests in reading and social studies had been administered to the pupils in the University of Alberta study. Early in June, the final interviews were carried out. Both times the pupils were transported to central locations where they were asked to "think aloud" as they answered and gave reasons for their answers to the problems selected from the S.T.E.P. test of social studies and to the problems with and without guiding questions. Following a set procedure, the interviewers attempted to elicit as full a response as possible and record it in writing.

The protocols, or records of verbalized responses, were marked with the aid of a check-list and a check-list guide. Social studies reading skills listed by Russell (9) and Fay (5) were selected for a check-list and then the check-list was adapted to the protocols. In its final form there were thirteen categories under three headings:—

CHECK LIST ON SOCIAL STUDIES READING SKILLS

I. *General Reading Ability*

1. Skill in defining the problem.
2. Skill in recognizing and understanding key words.
3. Skill in translating difficult material into more familiar terms.
4. Skill in interpreting pictorial representations, graph legends and symbols.
5. Skill in interpreting a map.

II. *Ability to Solve a Social Studies Problem or Problem of a Social Studies Type*

1. Skill in arranging ideas in sequence.

2. Skill in recognizing the limits of data.
3. Skill in picking out relevant data for a purpose.
4. Skill in using outside information to assist in reaching a solution.
5. Skill in drawing satisfactory conclusions.

III. *Ability to Use Social Studies Materials to Gather Information*

1. Skill in the use of the library.
2. Skill in locating information in a book.
3. Skill in preparing a report to a larger group.

A satisfactory degree of objectivity in marking was necessary. To simplify marking, the numbers of the problems were placed opposite the category to which each applied. A check mark (\checkmark) or an (x) was placed by the problem number. To give the markers a definite basis upon which to evaluate the responses a check-list guide was drawn up. Each protocol was marked by three markers working independently. The score allotted to the pupil was the average of the scores given by the three markers. The marked check lists were carefully compared and disagreement among the markers counted. The percentage disagreement in marking the protocols from the first round of interviews was 4.2%; for the second 3.3%.

Results

The t-test (7, pp. 184-185) and the sign test (11, pp. 68-75) for differences in paired samples were used to treat the February and June scores. These tests were suitable for small numbers. Tabulation of the results required twelve full-page tables which may be summarized in four tables using the following abbreviations:—

H. A.—High Achievers

L. A.—Low Achievers

E. H.—High Achievers from the experimental schools

C. H.—High Achievers from the control schools

E. L.—Low Achievers from the experimental schools

C. L.—Low Achievers from the control schools

S. T. E. P. scores—Scores from the S. T. E. P. test of social studies

V. R. S. T. E. P. Problems—Verbalized responses to problems selected from the S. T. E. P. test of social studies

V. R. S. S. Problems—Verbalized responses to social studies problems with guiding questions

V. R. Problems W. G. Q.—Verbalized responses to problems of the social studies type without guiding questions

G. H. M.—Group obtaining higher mean.

TABLE I
DIFFERENCE IN FEBRUARY SCORES (T-TEST)

Groups	Type of Data	G. H. M.	t-value	Level of Significance
H. A.	S.T.E.P. Scores	E. H.	.1370	.....
L. A.	S.T.E.P. Scores	C. L.	.6337	.....
H. A.	V. R. S.T.E.P. Problems	C. H.	1.1353	.....
L. A.	V. R. S.T.E.P. Problems	C. L.	.2196	.....
H. A.	V. R. S. S. Problems	C. H.	.0106	.....
L. A.	V. R. S. S. Problems	E. L.	1.1451	.....
H. A.	V. R. Problems W. G. Q.	E. H.	.4472	.....
L. A.	V. R. Problems W. G. Q.	C. L.	2.3763	.05

TABLE II
DIFFERENCES IN JUNE SCORES (T-TEST)

Groups	Type of Data	G. H. M.	t-value	Level of Significance
H. A.	S.T.E.P. Scores	E. H.	.2356	.....
L. A.	S.T.E.P. Scores	C. L.	.561	.....
H. A.	V. R. S.T.E.P. Problems	E. H.	3.272	.01
L. A.	V. R. S.T.E.P. Problems	E. L.	.808	.....
H. A.	V. R. S. S. Problems	E. H.	2.222	.05
L. A.	V. R. S. S. Problems	E. L.	.844	.....
H. A.	V. R. Problems W. G. Q.	E. H.	3.157	.01
L. A.	V. R. Problems W. G. Q.	E. L.	2.427	.05

TABLE III
AMOUNT OF IMPROVEMENT FEBRUARY TO JUNE (T-TEST)

Groups	Type of Data	G. H. M.	t-value	Level of Significance
E. H.	S.T.E.P. Scores	.....	4.677	.01
C. H.	S.T.E.P. Scores	.....	2.173	.05
E. L.	S.T.E.P. Scores	.....	2.746	.02
C. L.	S.T.E.P. Scores	.....	2.711	.02
E. H.	V. R. S.T.E.P. Problems	.....	3.886	.01
C. H.	V. R. S.T.E.P. Problems	*	.2097	.....
E. L.	V. R. S.T.E.P. Problems	.....	2.1417	.10
C. L.	V. R. S.T.E.P. Problems	.....	.768	.....
E. H.	V. R. S. S. Problems	.....	3.182	.01
C. H.	V. R. S. S. Problems	*	.372	.....
E. L.	V. R. S. S. Problems	.....	2.121	.10
C. L.	V. R. S. S. Problems	.....	3.0782	.01
E. H.	V. R. Problems W. G. Q.	.....	‡	.....
C. H.	V. R. Problems W. G. Q.	*	3.7319	.01
E. L.	V. R. Problems W. G. Q.	.....	1.229	.....
C. L.	V. R. Problems W. G. Q.	*	3.0542	.01

*February scores were higher than June scores.
‡Total improvement was calculated to be zero.

TABLE IV
DIFFERENCE IN IMPROVEMENT FEBRUARY TO JUNE
(SIGN TEST)

Groups	Type of Data	G. H. M.	Probability
H. A.	S.T.E.P. Scores	E. H. ....	.213
L. A.	S.T.E.P. Scores	C. L. ....	.910
H. A.	V. R. S.T.E.P. Problems	E. H. ....	.006
L. A.	V. R. S.T.E.P. Problems	E. L. ....	.213
H. A.	V. R. S. S. Problems	E. H. ....	.046
L. A.	V. R. S. S. Problems .....	.....	.....
H. A.	V. R. Problems W. G. Q.	E. H. ....	.006
L. A.	V. R. Problems W. G. Q.	E. L. ....	.006

It is evident from Table I that at the beginning of the study the groups of high and low achievers from the experimental schools did not show a significant difference from the groups of high and low achievers from the control schools in:

- (a) the use of social studies reading skills as shown by the S.T.E.P. test of social studies
- (b) verbalized responses to certain problems from the S.T.E.P. test of social studies
- (c) verbalized responses to problems with guiding questions

The high achievers from the experimental schools were not found to be significantly different from the high achievers from the control schools in verbalized responses to the problems without guiding questions. However, the low achievers from the control schools were found to be significantly better than the low achievers from the experimental schools in this respect. It was considered fortunate that it was the scores of the group from the control schools that were higher.

As can be seen in Table II, in June the groups of high and low achievers from the experimental schools were not significantly different from the groups of high and low achievers from the control schools in the use of social studies reading skills as shown by the S.T.E.P. test of social studies. However, Table III shows that the amount of improvement from February to June of the high achievers from the experimental schools was significant at the .01 level whereas the amount of improvement of the control group was significant at the .05 level, a lower level. Table III shows that the high achievers from the experimental schools were superior to the high achievers from the control schools in verbalized responses to problems from the S.T.E.P. test of social studies, and to social studies problems with guiding questions. The differences were significant at the .01 and .05 levels. The superiority of the group from the ex-

perimental schools in these two respects is further evident in Tables III and IV. In these respects, the low achievers from the experimental schools are shown in Table III to be not significantly different from the low achievers in the control schools.

Apparently, the pupils found the problem without guiding questions used in June more difficult than the problem used in February. The two problems appeared to require the use of the same skills but the data in the problem used in February may have been more familiar than the data in the June problem. At any rate, the scores of both groups from the control schools are shown by Table III to be significantly lower in June, whereas the scores of the group of high achievers from the experimental schools showed no gain and the scores of the group of low achievers showed a non-significant gain. As can be seen in Table II, the high achievers from the experimental schools were superior, in June, to the high achievers from the control schools and the difference was significant at the .01 level. The low achievers were significantly superior to the low achievers from the control schools even though the control group had been superior in February. The significance of the difference in improvement was further proven by use of the sign test, as can be seen in Table IV. The probability of .006 for both high and low achievers indicated a highly significant difference between the final performance of the pupils from the experimental schools, relative to their initial performance, and the final performance of the pupils from the control schools relative to their initial performance.

Conclusions

1. Although the training conducted by the University of Alberta was carried on for only four months it resulted in a worthwhile improvement in the use of social studies reading skills on social studies material, particularly by pupils at the upper level. Although neither high achievers nor low achievers from the experimental schools were significantly superior to the corresponding group from the control schools in the use of social studies reading skills as shown by the S.T.E.P. test of social studies, the amount of improvement shown by the group of high achievers from the experimental schools was significant at a higher level than the amount of improvement shown by the high achievers from the control schools. The initial scores made by many of the high achievers were close to the possible scores on the S.T.E.P. test of social studies. It may be that it was impossible for the high achievers from the experimental schools to show an improvement significantly greater than the improvement shown by the group from the control schools. In verbalized responses to problems from the S.T.E.P. test of social studies and

social studies reading problems with guiding questions the high achievers from the experimental schools were superior to the high achievers from the control schools. Perhaps a longer period of intensive training would produce significant results with the low achievers.

2. Apparently, intensive training in the use of social studies reading skills will assist pupils in related areas where these skills may be applied. Both the high and the low achievers from the experimental schools revealed a marked improvement in the ability to solve a problem of the social studies type without guiding questions. It is of interest to note that the group of low achievers from the experimental schools had not shown significantly greater improvement in the use of social studies reading skills on social studies problems with guiding questions. Probably the low achievers found the content of the social studies problems rather difficult, whereas the content of the problem of the social studies type was more within their experience. Consequently, the improvement of the group from the experimental schools in ability to read intelligently became apparent in the short four month period.

3. It was obvious that many pupils used dubious problem-solving procedures. The verbalized responses to problems from the standardized test revealed that the pupils selected answers by guessing if they were unable to use more intelligent means. Guessing could not be used as extensively to solve the problems with and without guiding questions. However, many pupils solved these problems on the basis of their personal feelings, or their imaginations, rather than by analyzing the information given. Evidently, verbalized responses can be analyzed to yield insight into the problem-solving processes of division two pupils.

4. Apparently, the interview technique can be used successfully with pupils of grades four, five and six. In this study the pupils received only a brief orientation before they were asked to respond to the test problems. In most cases their responses were satisfactory.

5. Verbalized responses from interviews, as outlined in this study, can be marked with a satisfactory degree of objectivity.

Educational Implications

1. Teaching techniques similar to those used by the teachers in the experimental schools of the University of Alberta study should be put to wider use.

2. Apparently, a longer period of training is required to produce significant results with pupils who are low achievers on a standardized reading test.

3. It appears that the techniques developed in the University study will assist pupils in several subject areas. Improvement in ability to solve the problem of a social studies type with content not taken from the social studies field would seem to indicate improvement in ability to solve certain problems in health, arithmetic, science, and some other subjects.

Observations of the Writer

Impressions gained by the writer, while marking the verbalized responses, led him to make certain observations.

1. Most division two pupils need to be taught to read problems carefully so that they have a clear understanding of what is required of them.
2. Most division two pupils need to be taught to read critically.
3. Many division two pupils need training in reading maps and charts.
4. Many division two pupils need training in reporting skills.

Limitations of the Study

The validity of the conclusions and recommendations may be affected by certain assumptions made at the beginning of the study and by the selection of pupils.

1. The S.T.E.P. test of social studies was assumed to be a valid measure of reading skills.
2. It was assumed that the problems with and without guiding questions were valid as measures of social studies reading skills.
3. It was assumed that division two pupils would be able to verbalize reasons for their answers to the various problems, and that an analysis of the verbalized responses would reveal their ability to use social studies reading skills, and yield insight into their problem-solving methods.
4. It is probable that more significant results may have been obtained from a training program carried on for a longer period of time.
5. It is possible that with a larger number of pupils somewhat different results might be obtained.
6. The pupils were selected on the basis of the S.T.E.P. test of reading. It is possible that intelligence and personality factors might affect the results of the study.

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ACHIEVEMENT TEST PERFORMANCE OF ACCULTURATED INDIAN CHILDREN

J. G. SNIDER

University of Alberta, Calgary

During the last half century, a considerable amount of research effort has been directed to the comparison of North American Indians and whites on measures of achievement. Such studies have shown a consistent superiority of white subjects on all scales and subscales. In general, investigators have been commendably cautious regarding those considerations which call for caution in interpreting this Indian-white differential: (a) the construction, standardization, and interpretation of these measures have been in terms of the modal white population, and (b) historically, the cultural characteristics of the North American Indian have been identifiably different from those of the modal norming group. For most measures of achievement, these considerations may be put in another way: achievement tests are constructed on the assumption that all of the individuals tested have had equal opportunity to learn those cultural factors necessary to the taking of the tests. When these tests are administered to North American Indian subjects, this necessary assumption is not easily met. We may expect, if this is the case, that the performance differences between North American Indians and whites will be smaller in cases where the Indian subjects and white subjects have experienced a common background. The available data are consistent with this expectation. Such a tendency can be noted in comparing early studies of Indian-white performance (3, 4, 5, 6, 7) with later studies (1, 2, 8, 9).

The present study is a further testing of the assumption that Indian-white performance differences on achievement tests are decreased with increased acculturation of North American Indian groups. The study was undertaken in the public schools of Lapwai, Idaho, where a sizeable proportion of the pupil population comprises Nezperce Indians. What is particularly relevant, in view of the concern stated here, is that the Nezperce Indians in this community are highly acculturated. No easily discernable distinctions can be made between the effective environments of the Indian and white groups: The Nezperce do not speak their native language at home, socio-economic indices for the two groups are quite similar, the usual age difference between the two groups in school does not obtain, and differential treatment of the two groups in the schools is not apparent. To state the foregoing more cautiously, while it may be

assumed that some cultural differences are represented in these two groups, we are probably safe in saying that the Nezperce Indians here represent a more highly acculturated group than is found in most other Indian-white communities.

This relatively unique situation provides an opportunity for testing the assumption that with increased acculturation of Indian groups, performance differentials on achievement tests will be decreased. In view of this, the following achievement tests were administered to all regularly enrolled pupils in the Lapwai secondary schools: the Cooperative English Test of the Educational Testing Service, and the Essential H. S. Content Battery, published by the World Book Company. For purposes of comparison, the "Indian" group was defined by the criterion used in the United States Indian Service, which classifies any individual as Nezperce who has one-fourth or more Nezperce blood.

Results

Table I summarizes the findings by grade level and measure of achievement. Only three of the nine differences in means are significant at the .05 level. It is interesting to note that the greatest differences occurred in the areas of mathematics and science. This

TABLE I
COMPARISON OF COOPERATIVE ENGLISH TEST SCORES,
AND ESSENTIAL HIGH SCHOOL CONTENT BATTERY
SCORES FOR INDIAN AND WHITE PUPILS

	Indians			Whites			Sig. of Mean diff.
	N	Mean	SD	N	Mean	SD	
Cooperative English Test Grades 9-12							
Reading Comprehension	41	17.9	19.3	79	25.4	20.6	sig. (10%)
Mechanics of Expression		20.2	19.1	.....	20.1	15.8	non-sig.
Effectiveness of Expression		16.3	14.4	.....	22.8	16.2	sig. (5%)
Total		15.3	17.0	.....	19.9	15.3	non-sig.
Essential H.S. Content Battery Grades 10-12							
Mathematics	19	28.6	18.2	43	39.7	18.3	sig. (5%)
Science		45.7	22.4	.....	58.7	22.0	sig. (5%)
Social Studies		26.5	16.2	.....	32.6	17.3	non-sig.
English		38.6	21.0	.....	39.5	22.3	non-sig.
Total		29.6	18.6	.....	38.4	18.2	sig. (10%)

suggests that perhaps such cultural differences as still exist between these groups center around those abstract and rational approaches to life which are probably more prevalent in the modal white population than in the Indian population. It is relevant to note, in view of the general orienting hypothesis put forward, that the variability of scores was quite similar for both groups. Taking the .10 level as significant, there were no significant differences between standard deviations of the two groups. Although the data are not reported, the range of scores for each group was very similar. In some instances the Indian group had a greater range than the white group. All distributions were positively skewed.

The data presented in the present study are consistent with the orienting hypothesis already noted: performance differentials between modal and non-modal cultural groups will decrease with increased acculturation of the non-modal group. Certainly the absolute differences found in this study are smaller than those found in previous studies. Moreover, in one instance the absolute difference in means was in favor of the Indian group.

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STAFF MEETINGS IN ALBERTA SCHOOLS

ERWIN MIKLOS AND JOHN H. M. ANDREWS
Faculty of Education

The regulations of the Department of Education require that a meeting of the teachers in every school in which more than two teachers are employed should be held at least once each month; it is the duty of the principal to convene such meetings and the duty of the assistant teachers to attend.¹ Apart from any regulations, writers in the field of supervision emphasize the usefulness of staff meetings as a means for improving the instructional program of a school. For the above reasons staff meetings have become, or should have become, an integral part of the operation of almost every school in this province and a part of the experiences of the teachers and principals in these schools. In spite of this very little is known about staff meeting practices or about how the personnel concerned with the meetings react to them.

Purposes of the Study

The main purpose of the study was to determine the opinions of teachers and principals concerning the purposes and practices which should be followed in holding staff meetings and to compare these with the actual purposes and practices as reported by the same teachers and principals. An attempt was also made to determine the ways in which teachers and principals found the meetings helpful as well as the problems which were encountered. On the basis of the study and of the literature on the subject recommendations were to be drawn for the improvement of staff meetings.

Method of Study

A questionnaire was designed for the purpose of obtaining the necessary information concerning both opinions and practices. The instrument was distributed to 431 teachers and 145 principals in 145 different schools which had been selected at random from the list of accredited secondary schools in Alberta. The study was, thus, restricted to schools which included at least some Senior High School courses as part of their programs. City schools were excluded from the study.

Four hundred sixty-three completed² questionnaires were re-

¹The Department of Education Act, R.S.A., 1942. Order in Council No. 1724/52, Revised General Regulations of the Department of Education for the Operation of Schools."

²Not all respondents completed every question.

turned by 119 principals, twenty-eight vice-principals, and 316 teachers. This represented a return of just over eighty per cent of the questionnaires which were distributed.

Purposes of Staff Meetings

The questionnaire suggested eleven purposes for which staff meetings might be held, and respondents were instructed to rank these according to their opinions of the order of importance of the purposes for holding staff meetings in their particular school. Respondents were again required to rank the purposes but this time it was according to the amount of time and attention devoted to each at the staff meetings in their schools. Since each purpose was assigned ranks covering almost the entire range of possibility, a frequency distribution of eleven categories was formed for each purpose. The median of each distribution was computed, and the purposes were then ranked according to the relative sizes of the medians. In making comparisons the median test was used to determine which differences were statistically significant.³ The one per cent level of significance was used.

Opinions

Teachers felt that the three most important reasons for holding staff meetings should be to discuss school discipline and pupil management, to try to improve the school's instructional program, and to study and discuss teachers' classroom problems in that order. Table I shows the rank assigned to each of the eleven purposes including those just listed and also shows that discussing community relations and providing a social activity for teachers were assigned the lowest rank orders.

The opinions of the principals are summarized in Table II and this shows that they agreed with the teachers as to which purposes should be among the top six and which should be among the last five but disagreed as to exact rank orders. A number of the differences were statistically significant. The principals were of the opinion that more importance should be attached to evaluating and to attempting to improve the instructional program than did the teachers. Principals would place less emphasis than teachers on discussing school discipline and would allot less time for principal's announcements at the meetings.

Reported Practices

Table I shows that the topics which were given the most time and attention included discussing school discipline, announce-

³Sidney Siegel, *Nonparametric Statistics for the Behavioral Sciences* (New York: McGraw-Hill Book Co., 1956), pp. 111-116.

TABLE I
COMPARISON OF THE OPINIONS OF TEACHERS WITH
THEIR REPORTS OF PRESENT SCHOOL PRACTICE
REGARDING THE ORDER OF IMPORTANCE OF ELEVEN
PURPOSES FOR HOLDING STAFF MEETINGS

	Opinion N = 305	Practice N = 284
	Rank	Rank
To discuss school discipline and pupil management	1	1
To try to improve the school's instructional program through a study of improved methods and procedures	2	6*
To study and discuss teachers' classroom problems	3	4
To discuss proposed administrative changes	4	3
To evaluate the present instructional program in the school	5	7*
To develop staff unity and morale	6	9*
To review current administrative practices	7	5
To discuss professional matters other than those relating directly to instruction	8	8
To provide an opportunity for the principal to make announcements to the staff	9	2*
To study and discuss community relations	10	10
To provide a social activity for teachers	11	11

*Differences in rank between opinions and reported practices indicate a difference which is statistically significant at the .01 level.

ments by the principal, and discussing proposed administrative changes. These were followed by studying teachers' classroom problems, reviewing current administrative practices, and attempting to improve the school's instructional program. It would appear that very little time is devoted to discussing community relations and to using the meetings as a social activity for the teachers.

A comparison of Table I with Table II shows that teachers and principals did not agree entirely as to the actual emphasis on purposes at staff meetings. They did agree that most time and attention was devoted to school discipline and pupil management and that the least time and attention was devoted to community relations and providing a social activity for teachers. Those were only three, however, which received identical rank orders. Of the differences five were statistically significant. As compared to teachers, principals reported less time spent on announcements and discussing professional matters other than those related directly to instruction. They also reported more time devoted to improving the school's instructional program, evaluating the present program, and to developing staff unity and morale.

TABLE II
COMPARISON OF THE OPINIONS OF PRINCIPALS WITH
THEIR REPORTS OF PRESENT SCHOOL PRACTICE
REGARDING THE ORDER OF IMPORTANCE OF ELEVEN
PURPOSES FOR HOLDING STAFF MEETINGS

	Opinion N = 111	Practice N = 110
	Rank	Rank
To try to improve the school's instructional program through a study of improved methods and procedures	1	3*
To evaluate the present instructional program in your school	2	6*
To study and discuss teachers' classroom problems	3	2
To develop staff unity and morale	4	4
To discuss school discipline and pupil management	5	1*
To discuss proposed administrative changes	6	5
To review current administrative practices	7	7
To discuss professional matters other than those relating directly to instruction	8	9
To study and discuss community relations	9	10
To provide an opportunity for the principal to make announcements to the staff	10	8
To provide a social activity for teachers	11	11

*Differences in rank between opinions and reported practices indicate a difference which is statistically significant at the .01 level.

Comparisons of Opinions and Reported Practices

By comparing the opinions of teachers with the practices they reported and the opinions of principals with the practices which they reported it was possible to determine the purposes which each group feels should be emphasized more or less than at present. These comparisons are shown in Table I and Table II.

Table I shows that there were four instances in which the difference between the practice reported and the opinion was statistically significant. It would appear that teachers favor placing more emphasis on trying to improve the school's instructional program, on evaluating the present instructional program, and on developing staff unity and morale. On the other hand they appear to favor a reduction in the amount of time which is devoted to principal's announcements at staff meetings.

Table II shows that the opinions of principals differed significantly from the practices they reported in three areas. They favored increasing the time and attention given to attempting to improve the school's instructional program and also to evaluating the present

program. A decrease in the time and attention was indicated for school discipline and pupil management.

It is encouraging to note that teachers and principals agreed in favoring increased time and attention for attempting to improve the school's instructional program and for evaluating the program. This is in general agreement with the literature in the field.

Practices in Holding Staff Meetings

The questionnaire also sought to determine the opinions of the respondents concerning various common practices and also the actual practices being followed in connection with staff meetings. In one set of questions the respondents selected responses from a number provided. In another set, the respondents indicated the frequency with which certain practices are carried out and should be carried out. Respondents also answered questions in which they indicated what they considered to be the values of holding staff meetings, the problems which were encountered, and their suggestions for improving the meetings.

Time, Number, and Place of Meeting

Respondents appeared to be willing to have the amount of time which they spent at staff meetings increased. Over 60 per cent indicated that they were in favor of spending at least two hours per month while more than one-half reported that they spent less than one hour each month at staff meetings. The number of meetings could also be increased. This is indicated by the fact that over one-half of the respondents favored holding at least two meetings each month while more than two-thirds reported that only one meeting was held.

The most favorable length for staff meetings seems to be from one to two hours. Forty-four per cent of the teachers and 34 per cent of the principals reported that their meetings were either longer or shorter than this. More than fifty per cent of the teachers favored holding meetings after school hours, as they most frequently are, but there are also indications that many of them would like to make use of some school time.

Many of the respondents had no preference as to what day of the week should be used for holding staff meetings. Days which are earlier in the week appeared to be favored by opinion, practice, and by the literature. The staff room is considered to be the most suitable place for holding meetings and is also the place which is most commonly used.

Agenda and Other Planning

The respondents favored having an agenda prepared beforehand

as it seems is done in many schools. Respondents favored an increase in the number of times that an agenda is made available to teachers before the meetings. The reports indicated that the principals were doing most of the planning for staff meetings while opinions favored giving the teachers a greater share in this. Opinions also seemed to indicate that the meetings should be scheduled for a particular day at a particular time and that it should not be a general practice to hold meetings only when the principal or the teachers feel that it is necessary.

Refreshments

Most of the respondents favored having refreshments served at least sometimes. The reported practices showed as much variation as did the opinions. More principals than teachers appeared to be in favor of having refreshments served.

Chairman and Teacher Participation

The investigation revealed that both teachers and principals favor having a teacher act as chairman more often than is being done now. It is interesting to note that principals were more in favor of this practice than were the teachers. Both groups felt that there should be an increase in teacher participation at the meetings.

Reaching Decisions

Over 80 per cent of the respondents thought that there should usually be an attempt made to reach consensus but that at times questions should be decided by a vote or by the principal. Respondents favored an increase in the practice of keeping a record summary of the meetings, and in making a summary available to the teachers.

Type of Meeting

Results appeared to show that the respondents favored a slight decrease in the number of informal meetings. This may be a reaction to the degree of informality rather than to informal meetings as such. Another practice in which respondents felt that there should be a decrease was in the number of oral announcements. It may be that respondents preferred to have announcements made from day to day through printed bulletins rather than having all of them left for staff meetings.

Attendance

There is general agreement that all teachers should attend the regular meetings and that they do. Some respondents favored holding grade-level staff meetings. This probably applies to those times when topics to be discussed concern only teachers of particular grades, especially in larger schools.

Values of Meetings

Most of the respondents felt that staff meetings were of some value, and over one-half indicated that the meetings helped to improve their classroom instruction. Meetings were considered to be helpful because they enabled teachers to learn about newer techniques and improved methods of teaching, to exchange ideas with other teachers, and to learn of improved methods of maintaining discipline. Teachers also stated that the meetings enabled them to obtain solutions to specific problems. Principals indicated that meetings helped them in the administration of the school. The main general value of holding staff meetings appeared to be that they brought about greater unity, cooperation, and understanding among staff members. Some teachers suggested that the main reason why they had not found the meetings helpful was that no attempt had been made to use them to try to improve instruction.

Problems

The main problems encountered in holding meetings appear to be a lack of time in which to plan and to hold meetings and also a lack of participation and interest on the part of some staff members. As might be expected, the main suggestions which the respondents had to make for improving the meetings were that there should be more and better planning and that teachers should participate in planning the meetings.

Recommendations

A major recommendation from this study appears frequently in the literature; that is, that the first meeting each year should be devoted to the cooperative planning of the meetings for the entire year and that teachers should have a part in planning such things as time, place, length, and frequency of meetings. The following recommendations are suggested to be used as a guide and could be modified to suit the circumstances of a particular school.

1. The main purpose for holding staff meetings should be to improve the school's instructional program with a reduction in the amount of time and emphasis devoted to administrative detail.
2. From two to four hours should be spent in staff meetings each month.
3. Two meetings each month should be held.
4. Each meeting should not be less than one hour nor more than two hours in length.
5. One of the meetings each month should be held after school hours; the other should be held partly in school hours, if possible.

6. The meetings should be held on a day early in the week.
7. If the size of the group permits, meetings should be held in the staff room. Otherwise the library or a classroom could be utilized.
8. An agenda should be prepared beforehand and should be made available to the teachers at least one day before the meeting.
9. Teachers should help develop the plan for each meeting as well as the overall yearly plan.
10. Each of the meetings should be part of a larger program of in-service training or of professional improvement.
11. Meetings should be scheduled for a particular day and for a specific time. Meetings should start and end on time.
12. Refreshments should be served before the meetings which are held entirely outside of school hours.
13. A teacher should sometimes act as chairman, but the principal should be in the chair when administrative matters are being discussed.
14. Teachers should be encouraged to take an active part in the discussions and should be invited to make reports on reading and on studies.
15. An attempt should always be made to reach consensus. If this fails, the question should, depending upon the issue, either be put to a vote or be left for the principal to decide.
16. There should be a recorder to take minutes of the meetings. The meetings should end with a summary, and a typed summary of the meeting should be distributed the day after the meeting.
17. Meetings should be informal but business-like.
18. Most schools should make use of bulletins for day to day announcements. Those announcements which have to be made at meetings should be made orally.
19. All teachers in the school should attend the regular meetings.
20. Teachers of a particular grade or particular subject should meet separately when the topics to be discussed are not of general interest.

A THREE YEAR ACADEMIC HISTORY OF EIGHT HUNDRED AND THIRTY-THREE SUPERIOR ALBERTA GRADE IX STUDENTS

DONALD B. BLACK

Division of Educational Psychology

Repeatedly one reads in the daily newspapers or hears in formal speeches or is told on the street that the schools are neglecting their brighter students. These students, it is claimed, do not measure up to potential and are leaving the schools in large numbers. Usually these comments are based on hearsay or on information about an individual student. Certainty is not to be had.

This study reports on the progress through high school of certain students identified in Grade IX as being of academically superior ability and performance. Performance was measured by the aggregate score on the five subjects of the Grade IX Departmental examinations. Specifically, these students stood in the eighth or ninth stanine on both the General Test and Grade IX aggregate test scores. Of 13,737 students writing the examination in June 1955, 833 or 6.1% of this group were thus identified as superior. This study examines the academic performance of these 833 students in Alberta high schools for the succeeding three years, and presents its findings under the following headings: type of school attended and type of program attempted; final marks in nine subjects matter fields for each of three senior high school years; total number of credits attempted and earned in each of three years; success in obtaining a High School Diploma; and a note on how many of these students achieved matriculation standing and entered the University of Alberta.

Data for this study were obtained from the records of the Department of Education and the Registrar's Office of the University of Alberta and were collected originally for the Cameron Royal Commission on Education.

I: Type of Program Attempted and Type of School Attended.

For this analysis, the high schools of the Province were categorized according to the number of teachers on staff. This categorization was based on data taken from the "A" cards for each school, which are submitted yearly to the Department by school superintendents and high school inspectors. The schools were classified for each of the four successive years of this study, 1955, '56, '57, '58 (Grades

IX through XII). High schools were classified as small if they taught a reduced program. i.e., if there was less than one teacher for each grade taught. The remaining categorization is self-evident with the exception of the large high schools, i.e., schools with more than eight teachers. These schools were divided into two classifications: composite high schools, and the remainder, which for the purposes of this study will be referred to as large academic high schools.

The original classification of student programs was based, first, on students attempting ten or more credits in vocational electives, second, those attempting Matriculation programs which could be identified from the courses attempted in a particular year, and finally, General program students which were those who did not fit in either of the above two categories. For the purposes of this study students attempting vocational and general programs were pooled into a single group called General program although it must be noted that certain students by full utilization of the forty credits of instruction, possible per week in Alberta schools, could attempt a matriculation program and still have the required number of vocational option credits to place them in the general program category.

Drop-out is another term that will require definition. A drop-out will mean any student who did not enroll in a high school in the Province of Alberta the following year. As can be seen, some of these students who will be classed as drop-outs may well have moved outside the province and entered high schools in their new place of residence or returned to Alberta high schools at a later date. In this particular regard, the Department of Education completed a follow-up study of eighty students scoring in the ninth stanine on the 1955 Grade IX Departmental aggregate score who dropped out at the end of Grade IX. It is noted that some of these eighty students are included in the present study sample. The Department found that of these eighty, 15 returned to Alberta schools, of whom 13 completed Alberta High School Diplomas, 9 of these being of matriculation standing. Twenty-four of the group moved from the Province and from the replies received, 14 continued their schooling in their new place of residence. Ten did not reply. Twenty-five of the students were legitimate drop-outs while another two died during the period under investigation. No trace could be found of the remaining fourteen students. In other words, of these eighty students identified as drop-outs, at least thirty-six per cent eventually continued their schooling in Alberta or elsewhere. It was not possible from the data available in this study to determine what proportion of the students dropping out were true drop-outs in the

TABLE I
DISTRIBUTION OF STUDENTS BY TYPE OF SCHOOL AND TYPE OF PROGRAM ATTEMPTED FOR
FOUR SUCCESSIVE YEARS OF HIGH SCHOOL IN ALBERTA (N = 833)

Program	Grade IX			Grade X				Grade XI				Grade XII	
	Enrol.		Dp. Ot.	Matric.		General		Matric.		General		Matric.	General
	Enrol.	Dp. Ot.	Enrol.	Dp. Ot.	Enrol.	Dp. Ot.	Enrol.	Dp. Ot.	Enrol.	Dp. Ot.	Enrol.	Enrol.	Enrol.
Type of School													
Small High Schools (less than 1 teacher/grade)	176	16	49	1	17	.....	30	1	61	2	63	7	7
Small Standard Time High Schools (1 teacher/grade)	159	14	119	2	81	1	95	7	15	1	91	6	6
Medium High Schools (4-8 teachers)	221	16	112	2	3	.....	129	10	19	5	119	16	16
Large (Academic High Schools) (over 8 teachers)	245	31	131	2	9	.....	139	7	11	1	130	20	20
Large (Composite) High Schools (over 8 teachers)	.....	.....	139	1	6	.....	135	6	57	11	151	26	26
Unidentified High Schools	32	6	39	.....	45	1	29	1	20	4	42	13	13
TOTALS	833	83	589	8	161	2	557	32	183	24	596	88	88

conventional meaning of the term. The figures cited must be considered as maximum and the reader is cautioned accordingly.

The analysis of data for type of program attempted and type of school attended is reported in Table I.

The first figure to note is the number of students dropping out. Eighty-three, or ten per cent, of the superior students dropped out at the end of grade nine, but only ten from Grade X. It will be noted that the ratio of General program to Matriculation students was 2:7. Most of the former came from small standard time and unidentified high schools, schools able to offer only a limited curriculum. This would restrict their choice, a restriction that is particularly evident in Grade XI, where the ratio of General to Matriculation differs little from that of Grade X. At the end of Grade XI, fifty-six students dropped out.

The Grade XII distribution of type of school to program attempted presents some conflicting trends. For example, while the number of students attempting Grade XII Matriculation programs in small high schools increases markedly over Grade XI, the same trend is not so apparent from the data on the Composite high schools. One explanation might be that curricular deficiencies have been overcome through enrolment in correspondence courses and other additions to a normal program, thus enabling the student to move from the General to the Matriculation route.

II: *Marks Received by Superior Students in Three Years of High School.*

In the analysis of the performance of gifted students, the courses available to them have been divided into nine broad categories: English, Social Studies, Mathematics, Science, Foreign Language, Commercial, General, Homemaking, and Technical electives. The General category consists of courses not fitting into the other categories and includes such options as Health and Physical Development, Physical Education, Art, Drama, Music, Psychology, Sociology, Economics, Arts and Crafts, Geology and Commercial Law. The distribution of marks of the superior students is compared with the marks obtained by all students in the original Royal Commission sample ($N = 13,739$) for these same grades, reported earlier by Black.* These data are presented in Tables II-IV.

The Tables show one fact clearly. These 750 students as a group performed in a fashion superior to the general grade population. Their marks for the most part fall in the 70-99 range although there are failures in every subject area for every grade. Perhaps one of

*Black, Donald B., "Distribution of Final Marks in Nine Course Areas in Alberta Senior High Schools." *Alberta Journal of Educational Research*, Vol. VI: 3, 137-152, (September, 1960).

TABLE II
PERCENT DISTRIBUTION OF MARKS ACHIEVED BY SUPERIOR STUDENTS (N = 750)
PERCENT DISTRIBUTION OF MARKS ACHIEVED BY ALL STUDENTS IN PROVINCE (N = 10,709)
IN GRADE X FOR NINE SUBJECT PATTERN AREAS

Subject Area	Final Grades										Not Attempted
	00-09	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	
English *S **P	1	1	8	6.2	4	3.6	16.1	41.2	35.0	3.7	5
Social Studies S P	1	2	1.7	6.1	8	3.6	13.7	30.9	40.6	10.3	6
Mathematics S P	7	7	3.8	7.8	8	6.8	16.7	21.6	35.0	18.3	3.9
Science S P	.01	2	1.1	5.9	3	4.3	15.6	33.9	35.9	10.0	1.2
Foreign Language S P	.6	1	2.1	3.8	14	11.5	14.9	21.6	34.5	15.5	80.3
Commercial S P	1.2	1	8	4	4.4	10.5	24.1	27.4	24.3	7.7	36.3
General S P	.03	.05	1	2	1.5	5.7	2.7	44.7	17.6	6	3
Home Making S P	1	1	3	1.3	1.2	4.0	12.7	28.2	45.4	8.7	76.8
Technical S P	1	1	4	2.7	5	7.6	26.6	34.8	24.5	5.5	75.5

*S: Superior Students
**P: All Students in the Province

TABLE III

PERCENT DISTRIBUTION OF MARKS ACHIEVED BY SUPERIOR STUDENTS (N = 740)

PERCENT DISTRIBUTION OF MARKS ACHIEVED BY ALL STUDENTS IN PROVINCE (N = 8,561)

IN GRADE XI FOR NINE SUBJECT PATTERN AREAS

Option	Final Grades										Not Attempted
	00-09	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	
English S P	.....	.....	.1 .7	.1 5.9	.6 18.2	5.7 25.2	19.1 25.6	39.3 16.7	30.9 6.4	4.2 .6	.3 .8
Social Studies S P	.....	.....	.3 1.3	.3 6.0	1.4 16.8	6.0 23.2	18.0 24.2	29.4 17.0	36.1 9.8	8.5 1.6	.4 1.3
Mathematics S P	.1 .04	.1 .4	.1 2.2	.4 5.9	2.5 17.0	12.1 26.5	19.3 21.0	22.3 14.5	28.8 9.8	14.3 2.7	2.4 17.7
Science S P	.....	.....	.....	.4 4.4	1.7 14.5	8.2 25.9	17.7 23.5	27.6 17.9	34.7 10.8	9.7 1.9	2.4 15.7
Foreign Language S P	.....	.....	.4 3.3	.8 5.2	3.9 13.7	11.3 22.5	17.8 20.4	23.3 17.2	31.9 13.0	10.6 3.8	4.2 30.9
Commerical S P	.6 .1	.....	.3 .7	.....	2.7 12.7	6.4 23.9	24.4 25.5	25.8 19.7	29.1 11.5	10.7 2.4	59.6 47.8
General S P	.2 .1	.....	.2 .5	1.7 2.1	2.9 8.2	6.7 20.4	19.2 32.4	29.6 23.8	32.2 10.8	7.3 1.6	35.3 33.8
Home Making S P	.....	.....	.....	.....	.8 4.5	6.6 13.4	13.9 24.5	32.0 31.5	35.2 21.2	11.5 3.5	83.5 79.3
Technical S P	.....	.....	.7 .4	.7 1.2	.7 6.4	8.6 21.2	25.7 32.2	27.1 24.6	32.9 12.2	3.6 1.8	81.1 76.7

TABLE IV

PERCENT DISTRIBUTION OF MARKS ACHIEVED BY SUPERIOR STUDENTS (N = 684)

PERCENT DISTRIBUTION OF MARKS ACHIEVED BY ALL STUDENTS IN PROVINCE (N = 6,339)

IN GRADE XII FOR NINE SUBJECT PATTERN AREAS

Option	Final Grades										Not Attempted
	00-09	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	
English S P	..........	......2	..... 2.7	..... 10.1	2.2 26.7	11.6 24.8	25.4 19.3	33.0 10.8	25.4 5.1	2.4 .3	1.0 2.9
Social Studies S P	..........	......7	..... 4.3	.1 10.1	2.5 24.0	8.9 24.0	29.7 20.9	32.0 10.6	23.2 4.9	3.6 .5	1.2 3.2
Mathematics S P	......6	.5 2.3	.3 3.5	1.5 6.5	12.2 23.8	22.4 26.9	24.0 19.5	23.9 11.8	11.9 4.3	3.3 .8	3.8 26.4
Science S P	......1	.1 .8	.4 4.9	1.1 11.1	8.4 24.2	16.2 25.3	28.9 19.9	27.7 9.9	13.7 3.3	3.5 .5	2.5 11.3
Foreign Language S P	......5	.5 2.1	.2 4.9	.5 5.5	8.4 20.5	18.3 25.5	29.0 21.0	25.0 13.8	13.8 4.8	4.3 1.4	7.7 33.1
Commerical S P	......2	......2	......5	..... 2.1	4.8 13.3	4.8 24.2	22.2 26.0	27.0 22.2	27.0 9.2	11.2 2.1	90.8 74.7
General S P	27.1 6.2	.9 .3	3.7 1.2	.9 2.0	..... 8.4	3.7 22.4	14.0 30.4	21.6 20.0	22.5 8.3	5.6 .8	84.4 69.5
Home Making S P	..... .....	5.9 .2	......4	......4	11.8 3.8	..... 14.2	23.5 31.8	17.6 29.9	29.4 18.5	11.8 .8	97.5 92.4
Technical S P	..........	......2	......5	......7	16.7 8.4	..... 22.6	16.7 36.2	33.2 23.8	16.7 7.1	16.7 .5	99.1 93.1

the most interesting features in the Grade X year is the small percentage of students who took a foreign language in that year. Foreign languages are normally begun in Grade XI.

As noted above, some of the students did in fact fail, the failure rate increasing with each year of high school. This increase occurred not just in the areas tested by the Grade XII Departmentals but in the vocational electives as well. Failure rates of over fourteen per cent in mathematics, and of ten per cent in science and foreign language options would suggest that the cause lies with the students and/or the schools themselves.

III: *Number of Credits Attempted and Earned for each Year of High School.*

This section deals with enrichment of program. The Alberta high school week is divided into forty credits of instruction time. It is normal for most students to attempt from thirty-four to thirty-six credits per week. Credit loads in excess of this are considered heavy for the average students. These data are presented in Table V.

From this Table, it can be seen that in Grades X and XI, the majority of superior students attempted full programs of thirty-seven or more credits, and for the most part were successful in achieving credit in the work attempted. However, in Grade XII an anomaly appears: a striking drop in the 37-40 credit registration and an equally striking increase in the 40 + registrations. The drop is probably accounted for by the student practice of making Grade XII a two-year program; the increase by the addition of extra-school music credits and of credits earned at special summer schools. In any event the preponderance of credit loads in excess of thirty-six suggests a tendency on the part of high schools to give the superior student an enriched program.

IV: *Success of Superior Grade IX Students in Obtaining a High School Diploma After Three Years of High School.*

The academic records of the superior students were examined to determine how many, after three years, achieved a High School Diploma, if this diploma was of matriculation standard, how many entered the University of Alberta in the fall, or on the contrary how many returned to high school. These data are presented in Table VI.

A number of points appear immediately from this Table. First, almost five hundred of the students achieved matriculation standing at the end of three years of high school. Of these, just over three hundred entered the University directly. Fifty-six returned for a

TABLE V
DISTRIBUTION OF SUPERIOR STUDENTS ON THE SCALE OF CREDITS

Credits	0-8	9-16	17-20	21-24	25-28	29-32	33-36	37-40	41 and Over*	Total
Grade X —Attempted .....	.....	.....	.....	1	.....	7	232	509	1	750
Grade X —Earned .....	.....	.....	.....	1	.....	9	233	506	1	750
Grade XI —Attempted	1	.....	2	4	7	30	280	416	.....	740
Grade XI —Earned	2	.....	2	17	10	38	264	407	.....	740
Grade XII —Attempted	3	1	10	3	25	200	370	46	26	684
Grade XII —Earned	3	7	16	5	32	200	352	44	25	684

*Credit for Music or attendance at summer school may account for credits exceeding 40 for any one year.

TABLE VI
GRADUATION STATUS OF 684 SUPERIOR STUDENTS AFTER THREE HIGH SCHOOL YEARS

Type of School Attended in Grade XII	Matriculation Standing			High School Diploma		Failed Diploma	
	N	Return 2nd year XII	Entered U of A in Fall	N	Returning for 2nd yr. of H. School	N	Returning for 2nd yr. of H. School
Small High School	53	5	33	11	3	6	2
Small Standard Time, High School	70	10	43	20	8	7	4
Medium High School	95	9	51	24	18	10	7
Large (Academic) High School	110	11	78	28	16	11	6
Composite High School	128	14	82	39	20	7	5
Unidentified High School	35	7	18	11	4	8	4
TOTALS	491	56	305	133	69	45	28

second year of Grade XII, presumably to raise their Department standings or to obtain credit in courses for admission to specific programs beyond high school. It is possible that students not entering the University of Alberta and not returning for a second year of grade twelve might have entered colleges and universities and/or entered programs demanding matriculation standards for admission, such as nursing. Of those achieving High School Diplomas but not with matriculation standard (133) over half (69) returned to take a second year of high school. Only forty-five superior students attempting Grade XII failed to obtain a High School Diploma at the end of the year but twenty-eight of these students returned to take a second year of Grade XII. It should be pointed out that undoubtedly many of those returning for a second year in these last two groups were students whose high school programs were planned to take four years to achieve matriculation standing. On this basis, many of the students failing to achieve a Diploma did so, not because of failing performance, but rather because their program did not include either English 30 or Social Studies 30 which are required subjects for a Diploma.

V. Summary

In summary, it was found that of students of high academic aptitude and performance as measured by the Grade IX Departmental Examinations, one in ten did not enter Grade X in this Province in the fall of the following year; one in eighty left school at the end of Grade X; one in sixteen at the end of Grade XI. Six in ten achieved Matriculation standing and a High School Diploma at the end of three years; one in six, a High School Diploma alone. Three in seventeen returned for a second year of high school while three in eight entered the University of Alberta in the fall, (three years after leaving Grade IX). One in fifty left Grade XII without a Diploma and without returning for a second year of Grade XII in this Province.

In terms of general academic performance during three years of high school covered in this study, these superior students as a group attempted ambitious high school programs and their achievement as a group was clearly superior to that of the Provincial population as a whole. On the other hand, it is noted that these students did have their failures. These occurred primarily in the areas of Mathematics, Science and Foreign Language options. As might be expected, however, the proportion of failures in all instances was well below the Provincial norm.

Several pertinent questions remain unanswered:

1. What are the facts regarding drop-outs? Collection of data on this point would necessitate a long-range intensive study.
2. What proportion of students take four or more years for the three grades of high school?
3. What type of career appeals to those who having completed Matriculation do not enter University?
4. Do superior students differ in any of these respects from the average student?

This report is mainly descriptive but conclusions are supported by statistics, admittedly incomplete. Two conclusions do seem well established, namely that superior students do not leave school prematurely in any great numbers, and that superior students achieve well in academic pursuits in the high school.

The Alberta Journal of Educational Research

Vol. VII, No. 2

June, 1961



THE COMMITTEE ON EDUCATIONAL RESEARCH

Faculty of Education

University of Alberta

ACKNOWLEDGMENT



This publication was made possible by funds granted by the Carnegie Corporation of New York. The Corporation is not, however, the author, owner, publisher, or proprietor of this publication, and it is not to be understood as approving by virtue of its grant any of the statements made or views expressed herein.

A STUDY OF THE LEISURE-TIME INTERESTS AND ACTIVITIES OF FIRST-YEAR WOMEN AT THE UNIVERSITY OF ALBERTA

RUBY O. ANDERSON
University of Alberta

Abstract

This study reports the results of a questionnaire concerning the leisure-time interests and pursuits of 342 first-year women at the University of Alberta. The students participated in a variety of activities, but there was need expressed for additional instruction in most cases and initial instruction in others. There was a general indication of a need for greater equality of opportunity for students from rural districts, those who had attended rural high schools, those in low socio-economic brackets, and those from homes where the parents have no education beyond high school.

The Nature and Extent of the Problem

The acceleration of technology and the spread of intellectual, social, and economic opportunities have made leisure more extensive than during any previous period in history. Automation will be with us to a greater extent with each passing year and as a result, the number of hours of leisure time is likely to increase. August Heckscher,² director of the Twentieth Century Fund, has estimated that the four-day week will be established in 1975. However, leisure is recognized as constituting both an asset and a problem as the value of leisure depends entirely upon its use.

Gerald Wendt,⁵ president of UNESCO Publications Centre stated that the students of today will have what no generation has ever had—complete time to live. They need education for this challenge as much as for earning a living. Eugene T. Lies⁴ emphasized the need for school administrators and teachers to be cognizant of the serious problems involved in the wrong use of leisure and the marvellous possibilities for human advancement with its right use. Only then, he maintained, will the phrase “preparation for life” be meaningful. In 1939, the American Association of School Administrators passed a resolution³ which stated their belief in a well-balanced school curriculum in which the fine arts would be included side by side with mathematics, history, and science.

In order that education can achieve its objectives of training the individual for life, educational programs must continually be evaluated, and, if necessary, be revised to conform with changes in the social and economic patterns. The American Psychiatric Association has set up a standing committee to study the relationship of

leisure to mental health. The Centre for the Study of Leisure is surveying this subject. The Twentieth Century Fund has plans for a major study of the problems of leisure, and numerous limited studies have been made.

Although surveys and studies made in the United States are of value in understanding youth and the leisure problems in general, the surest guide to the local situation is a study of the leisure-time interests and pursuits of Alberta youth. Marion Broer and Dolly A. J. Holland¹ stated that educating youth to meet life's problems can be accomplished more successfully if student objectives are satisfied and their interests and needs met in a way that is stimulating and pleasant to the students.

Purpose of the Study

The purpose of this study was to determine the leisure-time interests and pursuits of women who had completed their senior matriculation and were engaged in furthering their education at the University of Alberta. Only those students registered in a program leading to a Baccalaureate degree were included in the study.

In addition, the survey was planned to determine what effect factors such as geographic location of the home, type of high school attended, socio-economic status, the parents' education might have had upon the students' interests and participation.

Procedure

A questionnaire was designed to include a representative sample of leisure-time activities in each of the following areas:

1. Leisure Reading including books, magazines and newspapers.
2. Recreational Sports designed as physical activity including team sports, individual sports, and outing activities.
3. Fine Arts including music, art, and drama.
4. Home Recreation including activities such as entertaining, visiting, listening to radio, and viewing television.
5. Individual Recreation including activities such as attending the movies, dating, travel, and various handicrafts and hobbies.
6. Clubs and Societies including active membership and leadership in organized groups.

The questionnaire was checked for clarity and inclusiveness by conducting a pilot study with a class of students who were registered in the one-year teacher-training program. After some minor revisions, the questionnaire was given to 342 first-year students during the last two weeks of March, 1959.

Data obtained were then transferred to IBM cards which were sorted to extract the information necessary for analysis and tabulation.

Presentation and Interpretation of the Data
Leisure Reading

The students were asked to state their first to fifth choices from a list of five leisure-time activities. Their answers showed the following ranking:

	First Choice		Second Choice	
	Number	%	Number	%
Reading	119	34.79	131	38.01
Going to Movies	119	34.79	97	28.35
Attending Plays	69	20.17	77	22.51
Radio Listening	19	5.52	15	4.68
Television Viewing	13	3.80	19	5.52
No Answer or Incomplete ...	3	.93	3	.93

The foregoing tabulation shows that reading and going to movies were each listed as first choice by 34.79 per cent of the students. However, when second place ranking was taken into consideration, reading led the list as the most favored activity of the five named.

Fiction was preferred to non-fiction by a ratio of three to one, and the usual means of choosing a book was by author's name. In the fiction class, novels ranked as first choice, and in the non-fiction class biography ranked first.

The *Readers Digest* was the magazine preferred by most of the students. *Time* and *Newsweek* ranked second. Whereas 12.86 per cent of the students indicated their preference of magazines to books, 39.18 per cent stated that they preferred reading books. The other 47.96 per cent stated that they liked both equally as well.

Insofar as newspaper reading was concerned, 64.61 per cent read a newspaper regularly, and the sections usually read were the front page, the headlines and the comics.

The analysis of reading according to the factors selected served to indicate that city and town students do more leisure reading than students from the rural areas.

The amount of reading done and the interest in reading tended to increase proportionately with increased income, parents' education, and the availability of home libraries.

Recreational Sports

The participation percentages during the students' years at high

school and their one year at the University of Alberta are tabulated as follows:

Recreational Sports	High School	University
Individual Sports	90.99	59.95
Team Sports	87.13	38.30
Aquatics	44.73	21.34
Outing Activities	72.51	15.78
Dance	77.48	55.84

Individual Sports

The interests developed in individual sports during high school tended to continue into university with the most participation in bowling, skating and badminton. The greatest number of requests for instruction were made for badminton, tennis, and golf.

Tabulations made according to home location indicated that the rural students participated least, and although the town students were the most active participants during high school, the city students were the most active participants while at university.

Home location and socio-economic status had a very definite influence on the numbers who had private instruction in figure skating and golf. None of the rural students had private instruction and only five per cent of the students in the lowest socio-economic category had taken private instruction.

Parents' interest was primarily in golf, skating, and bowling, and although there was a correlation between parents' interest in golf and private instruction given to students, there was not a significant correlation between student participants and parents who were golf enthusiasts.

Team Sports

Student participation in team sports was considerably less than in individual sports. While at the university, students participated mainly in volleyball, basketball and curling.

The comparison of participation in individual and team sports showed the following distribution:

	Number	Per Cent
Present participation in individual sports only	100	29.23
Present participation in team sports only	26	7.60
Present participation in team and individual sports	105	30.70
No participation in individual or team sports	111	32.45

The above tabulation indicates that 111 students took no active part in individual sports or team sports during their first year at university. However, on further analysis it was found that 47 of these students did take some part in other recreational sports.

To determine whether present living accommodation had any

effect on participation, an analysis was made of the non participants. It was found, that, as a group, students living in residence had the lowest rate of non-participation. It was concluded that residence life was conducive to active participation.

Age is a factor that is sometimes stated as a reason for non-participation in sports. However, it was found that although the students ranged in age from seventeen to thirty-six, 71.87 per cent of the non-participants were in the seventeen to nineteen age group.

To determine whether parents' interest in curling had any correlation with students' participation in curling, an analysis was made of this one sport. Of the students who participated in curling, 41.95 per cent had parents who were curling enthusiasts. This was an increase over the golf correlation where 26.08 per cent of the parents were golfing enthusiasts.

The analysis according to home location indicated that the rural students had taken an active part in team sports especially in curling and fastball.

Aquatics

There was less participation in aquatics than in individual or in team sports. It was also noted that pleasure swimming was the sport in which the greatest number of requests for instruction were made.

Only 11.98 per cent of the students stated that their parents were interested participants or enthusiastic supporters of aquatics. This would seem to indicate that student interest was developed by agencies other than the home. As was noted in individual sports, the students from the country had the least opportunity for instruction in swimming.

Outing Activities

The outing activities in which there were the greatest numbers participating were picknicking, camping, and hiking. Parents' main interests were listed as fishing, camping, and hunting.

In determining a correlation between parents' and child's interests, it was found that although fishing ranked fifth in the list of activities enjoyed by the students, 48.73 per cent of these were from homes where the parents enjoyed fishing. It was also noted that participation in outing activities was least affected by low socio-economic status.

Dance

Information obtained from the dance section indicated that dance played a very important role as a leisure-time activity, and in present participation it ranked second to individual sports.

Requests for social dance instruction placed it eighth when ranked with requests in all recreational sports. However, dance instruction in high school and participation in high school had the greatest carry over value since participation in dance as a leisure-time activity ranked first at the university.

Fine Arts

The section in fine arts included information on the students' interests and participation in drama, art and music.

In the field of dramatics, participation during high school and university was mainly in amateur acting. When asked what they would like to do, costume design, make-up, and stage design were the activities most often listed. Approximately two-thirds of the students had taken part in some form of dramatics, and the students from the town high schools recorded the most participation during their high school years.

The greatest interest in art was shown in painting and sketching, but the numbers indicating their desire for participation in art was considerably less than for drama. It was also noted that 69.12 per cent of the students who participated in art were drama participants as well.

The majority of the students participated in some form of music. Seventy-one per cent had taken music lessons, and 64.32 per cent stated that they played a musical instrument. Semi-classical, popular, and classical opera were the three classes of music preferred. This interest was also evident from the kinds of records collected.

In an analysis of fine arts participation according to parents' education, it was found that art participation was not as dependent on parents' education as was drama participation. The general trend in music indicated that participation increased as education beyond high school increased.

Home Recreation

Family life constitutes a group experience which is the individual's first step in association with other people, and therefore is the basis for associations with subsequent groups. In this study, one-third of the students indicated that recreation as a family group was carried on frequently. However, in homes where the mother worked, there was a definite lack of family recreation.

Travel was indicated as the activity which was most often carried on by the family as a group. Entertaining and visiting friends, a social activity carried on in the home, ranked second. Card games (other than bridge) led the list of quiet games in which there was frequent participation and bridge was the game in which there was the greatest interest.

As was noted in the section on leisure reading, listening to the radio and viewing television ranked fourth and fifth respectively. In radio listening, popular music was the first choice, while symphony and news ranked as low seconds. The information on television viewing indicated 45.02 per cent of the students enjoyed watching television, 50.58 per cent enjoyed watching occasionally, and 4.4 per cent stated that they did not enjoy watching television. Theatre programs and family programs were watched and enjoyed most often.

According to home location, students from the rural areas indicated more frequent family recreation than did the students whose homes were in the city or town. It was also noted that although the students in the top income bracket ranked above the other two categories in frequent family recreation, those in the lowest income bracket were a very close second.

Individual Recreation

The questions in the section on individual recreation dealt with interest in a variety of activities.

The students' interest in going to movies was equal to their interest in leisure reading according to first choice ranking. Drama was listed by 44.75 per cent as the favorite type of show enjoyed; comedies and musicals ranked second and third respectively.

Attending dances and parties was the first choice of 47.66 per cent of the students as their preferred activity on a date. Attending plays and concerts, and going to the movies ranked second and third respectively. However, the students did not go to plays and concerts as often as desired.

Handicrafts and hobbies were an important leisure-time activity as 94.73 per cent of these students indicated that they participated frequently or occasionally. Dressmaking, collecting items, and caring for pets were the three hobbies in which there was the most frequent participation. When asked what they would like to do, leather craft and photography were listed most often.

Clubs and Societies

Clubs and societies are a medium through which the need for companionship can be satisfied. As a member of a club, and especially as a member of the executive, the ability for planning and organizing is developed.

The students in this study belonged to an average of 1.3 clubs. Membership was highest in faculty societies, religious clubs, and the women's fraternities.

Club membership at the university was considerably lower than club membership in high school, but there was an indication that the students planned to join more clubs during their second year.

Conclusions and Recommendations

1. Leisure-reading books are usually chosen by author's name. The high school leisure-reading program should continue to emphasize author's writing style and subject area so that students read books by different authors.
2. More and better libraries should be provided in the rural areas of Alberta. This recommendation is based on the comparatively small amount of reading done by rural students and on the lack of libraries in their homes.
3. The physical education programs for senior high schools in Alberta should be planned to include more emphasis on sports such as badminton tennis, golf, and archery. This recommendation is based on the students' requests for instruction in these activities.
4. Since more requests were made for swimming instruction than for any other recreational sport, it is recommended that swimming instruction be a part of every physical education program.
5. The number of students who expressed a desire for participation in drama and art exceeded the number who were participating. It was recommended that steps be taken to improve the opportunity for participation in drama and art in the high schools and at the University of Alberta, so that the students' desires can be realized.
6. Non-school agencies should provide additional opportunities for youth participation in all leisure-time activities and especially in the fine arts.
7. Since there is a lack of frequent family recreation, especially in the cities, it is recommended that all agencies should place more emphasis on this leisure-time activity.
8. An effort should be made to encourage the interest expressed in attending plays and concerts.
9. Students living away from home should be given guidance and encouragement in their leisure-time pursuits at the University of Alberta. University residence accommodation would be one means of helping them feel that they are part of a group. This suggestion is based on the high participation shown by the residence students in recreational sports.
10. Students from the rural areas and those who were in a low-income category had less opportunity for participation in leisure-

time activities. The school and the community should put forth every effort to help solve the lack of leisure-time pursuits experienced by these students. This recommendation is based on the requests for instruction and interest in these leisure-time pursuits.

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EXPECTATIONS OF SCHOOL BOARDS FOR THE ROLE OF THE PROVINCIALLY APPOINTED SUPERINTENDENT OF SCHOOLS IN ALBERTA

J. H. FINLAY AND A. W. REEVES

The Problem

It was the purpose of this study to make an intensive survey throughout Alberta of the expectations that school board members hold for the role of the provincially appointed superintendents of schools. In the course of the study the following questions were investigated:

1. What are the expectations of school boards for the role of the superintendent in (a) instructional leadership; (b) selection and management of staff personnel; (c) pupil personnel - transportation, attendance, discipline; (d) provision and maintenance of school facilities; (e) finance; (f) administrative organization and structure; and (g) public relations?
2. Do the expectations of county school committees differ significantly from those of school boards?
3. Do the expectations of chairmen of school committees and boards differ significantly from those of the members?
4. Do the expectations of inexperienced members differ significantly from those of experienced?
5. Do the expectations of persons engaged in business occupations differ significantly from those engaged in agriculture?
6. What relative importance do school board members attach to the areas of administration mentioned in (1) above?
7. Is there any significant difference in the importance attached to these administrative tasks by the groups mentioned in 2, 3, 4, and 5 above?

Need for the Study

The need for research to discover the range of expectations held by divisional boards for the performance of the superintendent's role was expressed by the Chief Superintendent of School for Alberta* in an address to the Alberta superintendents. Dr. Byrne stated that most superintendents are sensitive to the special expectancies of boards which they serve. If, however, the superintendent's role performance differs too markedly from board expectations, conflicts result. He adds that the uncertainty as to the board's expectancies and the task of discovering these is one of the first problems faced by the beginning superintendent.

*T. C. Byrne, in an address to the Alberta superintendents, January, 1958.

Collins**, in his study of the role of the provincial superintendent in Canada found, when he compared the expectations of superintendents with their actual behavior, that the greatest degree of conflict existed in the significance placed on sources of authority. Only in the activities related to instruction and instructional management did the superintendents acknowledge the authority of the Department of Education as the main determinant of their activities and behavior. Almost all superintendents interviewed in this study indicated that they would like to have a more careful definition of their position. They felt that the effectiveness of their work and the efficiency of the local school system were suffering because of conflicts inherent in the legitimate expectations of the various groups.

With the steadily increasing administrative load, this uncertainty with respect to the role of the superintendent is growing. Where at one time the total administrative staff of a school division consisted of the superintendent and secretary, today, in several divisions, it has grown to include such personnel as assistant superintendents, helping teachers, special subject supervisors, supervisors of instruction, librarians, stenographic help, and superintendents of works. These persons are all board employed. Do the boards expect them to work under the direction of a superintendent who is provincially employed? The problem is a complex one, and one that requires clarification.

Design of the Study

Through the cooperation of the school superintendent school board expectations were determined by means of a questionnaire. All divisional school board members and every county school committee member was given an opportunity to complete the questionnaire. Eight-four percent of a total of 324 forms was returned.

The questionnaire divided the role of the Alberta school superintendent into seven areas: instructional leadership, selection and management of staff personnel, pupil personnel, provision and maintenance of school facilities, school finance, administrative organization and structure, and public relations. Under each of these heads were listed critical tasks—forty-four in all—which school board members might expect the superintendent to perform. Respondents were asked to express their expectations of the superintendent in each of these tasks by choosing one of the following roles:

- (a) The superintendent should perform this duty independently of board direction.

**C. P. Collins, "The Role of the Provincially Appointed Superintendent of Schools in Larger Units of Administration in Canada". Unpublished Doctoral Dissertation. University of Alberta, 1958.

- (b) The superintendent should be responsible for the performance of this duty under the direction of the board.
- (c) The superintendent should be expected to act in an advisory capacity in this case.
- (d) This should not be considered a responsibility of the superintendent.

In addition to indicating their expectations of the superintendent for each administrative task, respondents were asked to rank the seven broad areas in the order in which they considered them to be important as administrative functions of the superintendent.

For the purpose of this study, it was necessary to obtain certain information about the respondents. They were asked to indicate whether they were county school committee or school board members, chairmen or members, inexperienced (less than two years) or experienced, their occupations, and past school contacts.

Summary of the Findings

1. The respondents in this study showed strong preference for independent action on the part of superintendents in the performance of duties related to instructional leadership. They considered this to be the most important function of the superintendent and few saw any need for directing him in this area of his work.
2. In the selection and management of staff personnel the majority of the respondents indicated that they expected the superintendent to act under the direction of the board with respect to the selection and placement of personnel: specifically principals and teachers.
3. In the same area of personnel management, respondents almost equally favored independent action or action under board direction for the superintendent in the task of directing the work of locally employed supervisory personnel.
4. In the selection and management of secretary-treasurers and other non-professional staff, the respondents indicated strongly that they expected the superintendent to assume no responsibility. Experienced members showed significantly higher expectations for the role of no responsibility regarding non-professional staff than did the inexperienced members.
5. Respondents expected the superintendents to take an active part in promoting the welfare of the teachers. While opinion was fairly evenly divided as to what form of action he should take, the greatest preference was shown for action under the direction of the board. Businessmen and farmers, however, disagreed

significantly here, with businessmen showing strong preference for independent action and farmers for action under board direction.

6. Respondents ranked selection and management of staff personnel second in importance only to instructional leadership as a function of the superintendent. They placed this above pupil personnel management, which area they ranked third in importance.
7. In the area of pupil personnel administration respondents indicated that they expected the superintendent to act independently of board direction in performing those tasks where professional knowledge of educational theory is essential. Where professional knowledge is not required, respondents favored the role of advisor for the superintendent.
8. Inexperienced and experienced board members differed significantly in expectations for superintendent action regarding several of the tasks related to pupil personnel administration. Where a difference occurred, the inexperienced members invariably showed expectations for greater independent action or board directed action by the superintendent while the experienced tended to favor the advisory role or, in some instances, no responsibility whatever.
9. Chairmen and members differed significantly in expectations for the role of the superintendent in the task of providing students with information about future job and educational opportunities. Chairmen showed greater expectations for superintendent action under board direction for this task than did the members, while the members favored the advisory role more strongly.
10. In tasks related to the provision and maintenance of school facilities, respondents in the main looked upon the superintendent as an advisor. Only in the matter of recommending an architect to the board did the respondents favor another role and then only by a difference of one per cent. Forty-four per cent favored no responsibility for the superintendent in this task while forty-three per cent favored the role of advisor.
11. Inexperienced and experienced board members differed significantly in six of the ten tasks related to provision and maintenance of school facilities. While, as stated above, the advisory role was generally favored, inexperienced members leaned more strongly towards superintendent action under board direction and the experienced more frequently showed preference for no responsibility by the superintendent.

12. In the first task of the above area—that of estimating the building needs of the division—businessmen and farmers differed significantly in six of the ten tasks related to provision and maintenance of school facilities. While, as stated above, the advisory role was generally favored, inexperienced members leaned more strongly towards superintendent action under board direction and the experienced more frequently showed preference for no responsibility by the superintendent.
13. In the area of school finance, respondents indicated clearly that they expected the superintendent to assume no more than an advisory role and when it came to making surveys with respect to equitable pay scales for non-professional employees, they expected the superintendent to assume no responsibility whatever. Here again, however, expectations of inexperienced members were significantly higher for superintendent action than were those of the more experienced.
14. In tasks related to administrative organization and structure, respondents again looked upon the superintendent as an advisor. Only in one of these tasks was a significant difference found between the expectations of two groups of respondents and again the difference was between inexperienced and experienced members. In the task of organizing local boards and committees, a significantly smaller number of inexperienced members favored the advisory role and larger percentages favored independent action or no responsibility at all than was the case for the experienced members.
15. Respondents ranked the area of finance as the least important administrative function of the provincially appointed superintendent.
16. In the area of public relations, respondents generally favored independent action by the superintendent. They did not, however, rank this area high in importance as a function of the superintendent. It was ranked fifth in importance, along with the areas of administrative organization and structure and the provision and maintenance of school facilities.

Conclusions

1. School boards in Alberta attach greatest significance to the provincially appointed superintendent's role as an instructional leader and expect him to perform the tasks related to this area independently of their action. As yet in Alberta, the major responsibility for curriculum lies with the provincial government. Board members are aware of this and expect the line officer of the Department of Education to assume a leadership

role, independent of their direction, in all matters concerning the improvement of instruction.

2. School boards in Alberta see the superintendent as acting in the capacity of an executive officer in hiring and placing teachers and principals in their schools.
3. School boards expect the superintendent to direct the work of locally employed supervisory personnel. There appears to be little danger that boards will by-pass the superintendent and deal directly with locally employed supervisory staff.
4. School boards wish to direct the work of non-professional staff themselves. They do not see the superintendent assuming any responsibility in this area.
5. The fact that the area of selection and management of staff personnel was ranked second in importance to instructional leadership as a function of the superintendent, leads one to conclude that school boards hold high regard for the superintendent's services in the employment of professional staff, realizing fully the impact that careful selection of staff can have upon instruction in the classroom.
6. The more confident or capable board members feel with respect to an administrative task the less inclined they are to delegate authority to the superintendent. One can conclude here that board members like to consider themselves as administrators rather than simply legislators or policy makers. Invariably, there were fewer expectations for superintendent action when the task being considered was one which could be performed by a layman. And further, to substantiate this conclusion, the more experienced a board member was, the less expectations he held for superintendent action.
7. The fact that the area of finance was ranked least in importance as a function of the superintendent forces one to conclude that boards in Alberta wish to retain very close control of spending. It is obvious that they do not consider that the superintendent must be an expert in this field. This conclusion is closely related to the preceding one and further emphasizes that board members prefer to consider themselves as administrators.

Further Research

Students of administration, whether concerned with business, hospitals or schools, have always seen a clear distinction between the major function of a board and that of its professional staff. In general the board is pictured as a body of laymen which exercises control without getting involved in the machinery of operation, by

setting up guides for discretionary action on the part of its executives. The chief executive officer, in the case of a school system the superintendent, has the task of translating the board's policy into action. The actual administration of the enterprise is delegated to a professional staff while control is by the board exercised through the determination of policy.

School superintendents, it was stated earlier, need to be sensitive to the realities of the administrative system in which they work. These men have a role to play, a role which is influenced by many reference groups. This study leaves little doubt about the image of the superintendency held by the rural trustee of Alberta. It would be interesting to contrast the provincial superintendent's role envisaged by the school board members with that propounded by graduate schools of administration, with that expected by teachers, by citizens of the community, the Department of Education, and even by the superintendents themselves. Further research might also seek to explain why, in the midst of extensive organization of large units of school administration, the pattern of school board operation in rural Alberta differs little from that in existence prior to the formation of the divisions over twenty years ago. What has been the experience in other provinces where the rural superintendent is also provincially employed? What are the expectancies of school board members for the superintendent in towns and the smaller cities in which this official is locally employed? This study is one of a series that will explore the place of the school superintendent in Canadian school administration.

PROLEGOMENA TO A SYSTEMATIC STUDY OF MOTIVATION IN EDUCATION: I SKINNER*

CHARLES C. ANDERSON
Faculty of Education

Educational research on motivation, defined by Lindsley (1957) as the "... combination of forces which initiate, direct, and sustain behavior toward a goal" (1957, p. 48), has been of little value because of its disconcertingly unsystematic quality. For example, the following factors have been claimed as facilitating good academic motivation: independent discovery (Kersh, 1959); writing comments about objective examinations (Calvin et al., 1957); knowledge of results (Della-Piana, 1957); no independent variables such as praise and reproof (Silberman, 1957); intelligence, socio-economic status, large enrolment and good morale (Kemp, 1955); a drive for higher occupational status (Hieronymous, 1951); frequent testing (Fitch, Drucker and Norton, 1951); group study (Blue, 1958); five clusters of Murray's needs (Middleton and Guthrie, 1959)—this list could be extended further. Occasionally someone (Holland, 1959) attempts to produce a meaningful synthesis by linking some of these strands, but this cure is worse than the disease:

... these findings suggest that the high achiever lacks capacity for status, is unsociable, lacks poise and self-confidence, is self-deprecating and inflexible, minimizes worries and complaints, is conscientious and responsible, is well-controlled, and creates a favourable impression, does well academically under direction but is not as adept in situations demanding independent judgement, is interested in and responsive to the feelings of others and has feminine interests. (1959, p. 140).

Clearly this will never do: the teacher must have some general conception of good motivation which he can apply to the interpretation, control and change of children's behaviour in a variety of circumstances. The educational psychologist must be able to provide him with such an academically sound systematic approach with which the teacher can replace his own home-made constructions.

Where can such an approach be found?

The first source is clearly Skinner (1953) (1959), who relies for his explanation of behavior on functional relationships between stimulus and response, regarding as fictitious and tautological any causal explanation couched in terms of "inner events" intervening between stimulus and response. This functional analysis of behaviour involves the position that the variables of which behaviour is a function lie outside the organism and it is these variables that we

*This is the first in a series of three articles.

must manipulate if we wish to control and predict behaviour (*ibid.*, p. 35). Accordingly, what specific environmental condition is responsible for motivating operant (voluntary) behaviour? The answer is deprivation or refusal to allow the organism the gratification of fundamental drives which are sources of primary reinforcement because they are biologically advantageous (*ibid.*, p. 83). Primary reinforcers can be classified as positive (presenting stimuli such as food and water to the individual) and negative (presenting a loud noise or bright light or electric shock to the organism), and it is generally assumed (Bindra, 1959, p. 116) that the former increase the habit strength of an associated response, the latter decrease it.

Primary reinforcement (with food, for example) of a biological drive (hunger) brings the organism under the control of the appropriate deprivation, (relative starvation) and, consequently, acquired secondary reinforcers may be set up in the environment to motivate behaviour just as strongly as their unconditioned associates originally did provided these reinforcers have a consistent or moderately consistent connection with the primary rewards and are not transiently and artificially linked with them as a result of the researcher's experimental design. Consider, for example, the power of a generalised secondary reinforcer such as money.

A conditioned reinforcer is generalized when it is paired with more than the one primary reinforcer. The generalized reinforcer is useful because the momentary condition of the organism is not likely to be important. The operant strength generated by a **single reinforcement** is observed only under an appropriate condition of deprivation—when we reinforced with food, we gain control over the hungry man. **But if a conditioned reinforcer has been paired with reinforcers appropriate to many conditions**, at least one appropriate state of deprivation is more likely to prevail upon a later occasion. A response is therefore more likely to occur. When we reinforce with money, for example, our subsequent control is relatively independent of monetary deprivations. (*ibid.*, p. 77)

Various generalised reinforcers are discussed, including attention (*ibid.* p. 78) and approval and affection.

Attention is often not enough. Another person is likely to reinforce only that part of one's behavior of which he approves, and any sign of his **approval** therefore becomes reinforcing in its own right. Behavior which evokes a smile or the verbal response "That's right" or "Good" or any other commendation is strengthened. We use this generalized reinforcer to establish and shape the behavior of others, particularly in education. For example, we teach both children and adults to speak correctly by saying "That's right" when appropriate behavior is emitted.

A still stronger generalized reinforcer is **affection**. It may be especially connected with sexual contact as a primary reinforcer but when anyone who shows affection supplies other kinds of reinforcement as well, the effect is generalized. (*ibid.*, p. 78).

All generalised secondary reinforcers such as the above together with educational tokens such as grades, diplomas and degrees, shape and maintain behaviour if applied according to the best schedules of

reinforcement, notably differential reinforcement, the rewarding of correct and the non-rewarding of incorrect responses, and intermittent reinforcement, the application of rewards sporadically and not consistently (*ibid.*, pp. 91-100).

What has all this to do with education? Firstly, there is the question of punishment; Skinner notes its ubiquity, questions its morality (*ibid.* p. 182), denies its efficiency. Relying on Thorndike's later work and his own conditioning experiments, he reports the findings that punished responses are not eradicated but merely repressed, and that they will, if later allowed to go unpunished, reappear again after the fashion of Freud's repressed wishes (*ibid.*, p. 183). Another undesirable after-effect of punishment is the presence of guilt feelings which are strengthened by parental verbal reinforcers. (*ibid.*, p. 188).

And with what would Skinner replace punishment of this sort? Unlike many other writers, he states his remedy quite openly. Using adequate schedules of reinforcement and an adequate reinforcer, he would 'shape up' behaviour in the desired direction (1959, pp. 137-138).

The current nationwide problem of school discipline is frequently, though possibly erroneously, attributed to progressive education. Whatever its explanation, it is a serious problem. How can we recapture the orderly conduct once attributed to discipline without reinstating all the understandable by-products of an inhumane aversive control? The answer is: use positive reinforcement instead of punishment. But how? A first step is to analyse the reinforcing contingencies in the classroom. In particular, what reinforcers are available to the teacher? The answer to that question is sometimes discouraging, but even in the worst possible case she can at least reinforce a class by dismissing it. The point is that she must understand that dismissal is reinforcing if she is not to throw away the small measure of power it offers her. The 'natural' thing is for a teacher to dismiss the class when its conduct is most aversive to her. But this is exactly the wrong thing to do, for she then differentially reinforces the very behaviour she wants to suppress. A teacher who understands reinforcement will survey the class during the final minutes of a period and choose for dismissal the moment at which things are going as well as can be expected. (1959, pp. 138-139).

It is easy to be cynical about this—for example, it presupposes that a class is of homogeneous ability or that reinforcement on an individual basis is possible—but comment is superfluous until this strategy is put to an experimental test. Certainly the evidence of both Postman (1948) and Mowrer (1960) suggests that punishment can be efficacious under certain circumstances in promoting the avoidance of certain undesirable responses.

Other contributions of Skinner to education, most notably his invention and championing of teaching machines, are based on the same view of motivation as the presenting of positive reinforcers according to the best schedules of reinforcement. For example, Keislar

(1959) has argued, from a Skinnerian point of view, that the problem of arousing a 'set to learn' becomes that of presenting to the student stimuli which have been previously presented when the student's learning has been reinforced successfully. Specifically, if students are reinforced for exhibiting this learning set in a variety of situations where a common distinctive stimulus is present, then that stimulus as a second-order reinforcer will acquire control of the learning set and the subjects will learn when this stimulus is present. Examples of the successful reinforcer might be, depending on the age of the children, consumables and manipulables in the shape of marbles, toys, trinkets, dime-size cookies (Bijou, 1957). Examples of the stimuli acquiring reinforcing properties are, according to Keislar, 'Now pay close attention,' 'I am going to give you a test,' 'This is how jet airplanes fly', 'Here is how you can earn money', 'This is important', and so forth. And why do teachers say these things without much apparent effect on the class? The answer is that children have not been reinforced at the same time as these verbal responses were being made. We do wrong, according to Keislar, to label such behaviour as 'disinterested' and to ascribe it to 'individual differences', the personality of the child, and so on; such statements about 'inner events' are merely labels for the behaviour we observe and are of little help in remedying the situation. The helpful approach is to recognise that the children's learning in the past has not been reinforced under these circumstances.

How useful is all this for education? The value of Skinner's conception of reinforcement is considerable, although some educators might assert that he is too optimistic about the amount and strength of the reinforcers available to the teacher. However, Skinner is placing constraints on the applicability of his system by declining to recognise the necessity of taking into account events going on between stimulus and response. These mediational variables are a necessary and economical way of accounting for the fact that not infrequently the same stimulus provokes a different response in different people. Often certain teachers are sources of positive reinforcement to some students, of negative reinforcement to others. Reinforcement is not necessarily divorcible from the personality of the individual, a fact which causes practical instructional and administrative problems, and a more adequate account of motivation must take some account of these elusive mediational variables.

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DIFFERENTIAL GRADE PREDICTION: A NOTE ON ITS EFFECTIVENESS FOR A FRESHMAN CLASS OF ENGINEERS

DONALD B. BLACK

*Division of Educational Psychology
Faculty of Education*

An earlier article by Black (1960) proposed a method of predicting freshman success in the University of Alberta using the technique of differential grade prediction. This paper will report the effectiveness of this technique to predict freshman Engineering success for the class of 1957-58.

Two methods of predicting success by this technique will be used: first, using seven Grade XII Departmental scores, English 30, Social Studies 30, Mathematics 30 and 31, Physics 30, Chemistry 30 and the score on the Foreign Language 30 examination: and second, using five Grade XII Departmental examination-based scores, English 30, Social Studies 30, the average of the two Mathematics 30 and 31 scores, (Math X), the average of the Physics 30 and Chemistry 30 scores (Science X), and the Foreign Language 30 score.

Method

The prediction equations for seven and five predictor variables in eight Engineering courses and freshman Engineering average were determined from the 1956-57 freshman Engineering class. These equations are presented in Table I.

A sample of 245 Engineering freshmen from the class entering in the fall of 1957 was chosen for this study. This is called the Operational sample. Only those students who were from outside the Province or who had completed their high school programs before the present system of Departmental examinations was instituted, were excluded from the study. Each student had his marks in freshman Engineering courses predicted by the two methods. The predicted grades were then compared with the marks actually achieved. The accuracy of these predictions was determined and was compared with the accuracy predicted from the 1956-57 sample, the Developmental sample.

Results

The correlation coefficients and standard errors of estimate between predicted and actual marks are reported in Table II. It should be noted here that during the 1957-58 year, the Faculty of Engineering introduced a new course, Drawing 2, to replace the

TABLE I
PREDICTION EQUATIONS FOR ENGINEERING FRESHMEN
USING SEVEN AND FIVE VARIABLES

Predictor Variable	Engineering Variable								
	C.E. 5	C.E. 6	Draw 2	Draw 4	E.M. 1	Physics 21	Math. 2	Chem. 40	Average
English 30	.....	.....	.....	.....	.....	.....	.....	.....	.....
Social Studies 30	.265	.....	.148	.....	.188	.....	.263	.204	.175
Mathematics 30	.....	—111	.....	.....	.....	.....	.322	.....	.....
Mathematics 31	.340	.....	.103	.....	.374	.119	.487	.293	.259
Physics 30	.296	.....	.306	.538	.359	1.260	.456	.360	.457
Chemistry 30	.....	.....	.....	.....	.....	.....	.....	.370	.....
Foreign Language 30	.....	.....	.....	.....	.143	.....	.....	.....	.....
Constant	— 8.40	72.62	23.50	31.83	—12.00	—41.36	—48.11	—26.59	.62
English 30	.....	.....	.....	.124	.....	.....	.....	.....	.....
Social Studies 30	.322	.059	.129	.....	.286	.....	.279	.194	.167
Mathematics X	.620	.....	.....	.....	.810	.497	1.006	.322	.435
Science X	.....	.....	.405	.494	.....	1.119	.327	.762	.371
Foreign Language 30	.....	.....	.....	.....	.....	.....	.....	.....	.....
Constant	4.22	60.45	29.40	26.79	—15.50	—53.38	—53.91	—30.32	—5.83

former two drawing courses. Therefore, the predictions for Drawing 2 and 4 are compared with the mark received in the new course Drawing 2.

TABLE II

ESTIMATED AND ACTUAL CORRELATION COEFFICIENTS
AND STANDARD ERRORS OF ESTIMATE FOR PREDICTED
AND RECEIVED MARKS IN NINE ENGINEERING FRESHMAN
VARIABLES USING TWO SETS OF PREDICTOR VARIABLES

Engineer Variable	Seven Variable Prediction				Five Variable Prediction			
	Estimated ¹		Actual		Estimated ¹		Actual	
	R	δ est.	r	δ est.	R	δ est.	r	δ est.
C.E. 5 .....	.565	10.7	.450	12.2	.545	10.9	.391	12.9
C.E. 6 .....	.124	8.1	— .116	7.6	.079	8.2	.111	6.8
Draw 2 .....	.510	7.6	.409	9.8	.481	7.7	.363	11.2
Draw 4 .....	.410	10.1	.420 ²	12.4	.416	10.2	.403 ²	12.5
E.M. 1 .....	.539	13.4	.506	12.7	.522	13.6	.457	13.5
Physics 21 .....	.654	15.4	.611	14.5	.629	15.7	.638	14.3
Math. 2 .....	.692	12.8	.566	15.1	.683	13.0	.563	14.7
Chem 40 .....	.698	10.1	.590	11.6	.690	10.2	.606	11.4
Eng. Aver. ....	.686	7.8	.558	8.6	.670	8.0	.551	8.3

¹(From, Black, 1960, Table II, p. 44.)

²All Drawing 4 predictions are compared with 1957-58 Drawing 2 marks.

A number of observations can be made from this table. First, with one or two notable exceptions the actual relationships between predicted and received marks fell reasonably close to those predicted. C.E. 6 predictions, at best, were little better than a guess and this has been confirmed by the data. In every case except for this particular course, the relationships were lower than those predicted but this is to be expected considering the questionable year to year reliability of the scores used in the predictor and criterion variables. The Drawing 2 correlation coefficients were not as close as those of the other variables. This could be attributed to the fact that Drawing 2 was a new course. Generally speaking, however, the relation-

ships did not drop nearly as much as had been anticipated. This would suggest that the form to form reliability of evaluation in both the Grade XII and University course variables might be somewhat higher than heretofore suspected.

A second observation is readily apparent, that of the “regression effect” of the predicted marks. This is reflected in the generally higher standard error of estimates actually found. Inasmuch as this is a known weakness of the technique, this finding was not surprising. It should be noted that while techniques have been devised to offset this limitation, such correction procedures were not used in this study. Had they been used, the resulting correlations be-

TABLE III
PERFORMANCE OF THE DEVELOPMENTAL AND
OPERATIONAL SAMPLES ON THE GRADE XII
DEPARTMENTAL SCORE VARIABLES

Grade XII Variable		Develop- mental Sample (N = 131)	Operational Sample (N = 245)	Signifi- cance of Difference
English 30	X	65.2	63.8	NSD
	S.D.	10.2	9.6	
Social Studies 30	X	73.3	69.9	1%
	S.D.	10.5	10.9	
Mathematics 30	X	74.4	72.6	NSD
	S.D.	10.3	9.2	
Mathematics 31*	X	69.4	70.3	NSD
	S.D.	14.1	11.3	
Physics 30	X	72.8	70.6	NSD
	S.D.	10.6	9.4	
Chemistry 30	X	73.2	72.1	NSD
	S.D.	11.9	9.4	
Foreign Language 30	X	66.2	65.7	NSD
	S.D.	11.6	10.1	
Mathematics X	X	71.6	71.3	NSD
	S.D.	10.8	8.7	
Science X	X	72.7	71.1	NSD
	S.D.	10.4	8.5	

*Mathematics 31 is a teacher-assigned mark and not determined by Departmental Examination.

tween predicted and actual grades might have been higher than those reported. In any event, the size of standard errors of estimate would have been reduced.

A third aspect of the above table is the relative merit of seven predictor variable equations compared with the five variable predictions. As reported earlier by Black (1960: p. 45) the five predictor variables are not as effective as seven but the relative loss in predictive efficiency is offset by the ease of calculating predicted grades in the schools. Were a computer available, the seven variables equations would be preferred.

Certain other questions arose regarding the comparability of the two samples used in the study, i.e., the sample used to develop the prediction equations (Developmental sample) and the sample on which these equations were used to predict grades (Operational sample). Were these two samples of like ability as measured by performance on the Grade XII Departmentals and did they perform equally well in University? The data to answer these questions are reported in Tables III and IV. The differences between means of the reported variables were tested for statistical significance and are also reported in the above noted tables.

From Table III, it will be observed that only one significant difference was found between the admission qualifications of the two study samples, that of Social Studies 30 which favored the Developmental group. However, looking at all nine variables, the means in all but one instance were higher in favor of the Developmental group. The sole exception was the Mathematics 31 score which is a teacher assigned score. Statistically, using the Sign Test (Siegel, 1956, p. 68-75), the chances of mean differences favoring one group of this order (six in seven) would have a probability of .062. Therefore, we can conclude with some certainty that the Developmental sample presented, as a group, higher overall admission credentials than did the Operational sample although the difference between individual admission scores are, for the most part, not significant.

Table IV, however, reveals a completely different picture. The Operational group as a whole performed much more poorly in the freshman year of Drawing 2 (a new course which probably should not be compared with courses of the previous year and no longer taught), Physics 21, Mathematics 2, and Chemistry 40. Inasmuch as the Engineering freshman courses with the one exception of the new course, Drawing 2, do not differ significantly from the marks in the same course from the previous year, one can conclude that an equivalent method of evaluating students must have been used over the period of the study. For the other three courses, Physics

TABLE IV
PERFORMANCE OF THE DEVELOPMENTAL AND
OPERATIONAL SAMPLES ON NINE FRESHMAN
ENGINEERING VARIABLES

Engineering Variable		Develop- mental Sample (N = 131)	Operational Sample (N = 245)	Signifi- cance of Difference
C.E. 5	X	62.5	60.9	NSD
	S.D.	13.0	13.5	
C.E. 6	X	64.6	65.8	NSD
	S.D.	8.2	6.8	
Draw 2	X	67.2	62.1	1%
	S.D.	8.8	10.8	
Draw 4	X	69.8	62.1	1%
	S.D.	11.2	10.8	
E.M. 1	X	62.2	62.5	NSD
	S.D.	15.9	15.1	
Physics 21	X	61.6	54.6	1%
	S.D.	20.2	16.5	
Mathematics 2	X	60.5	68.0	1%
	S.D.	17.7	15.9	
Chemistry 40	X	60.4	57.1	5%
	S.D.	14.1	13.5	
Engineering Average	X	63.3	61.4	NSD
	S.D.	10.8	11.3	

21, Mathematics 2 and Chemistry 40, which are taught in the Faculty of Arts and Science, the performance of the Operational group on these variables was much below that which might have been anticipated considering the slightly poorer admission qualifications of this group. It seems apparent that different criteria were used to evaluate students in the Developmental sample than existed one year later when the Operational group took the same courses.

It is not the purpose of this paper to evaluate the marking procedures of university professors although it can be readily seen that greater consistency would improve predictions of academic success from year to year. It would seem that although the marks of students in the second year of the study were lower, the general rank ordering of the students did not vary greatly from those of the

previous year. This is evidenced by the relative stability of the correlation coefficients for the two samples reported earlier.

The phenomenon reported above is not unknown in other institutions conducting long-range admission research. It is apparent, however, that if the data from admission research are to be of maximum use in guidance, they must be continuously revised or at a minimum, based on marks obtained from several years so that year to year variations will be minimized so as not to cause discrepancies between predicted and actual marks of the magnitude reported here.

Summary

This study found, first, that marks predicted from five predictor variables were almost equally valid with those predicted from seven variables; second, that predicted marks for a class based on data from a previous year continued to be valid although somewhat less so; and third, continuous revision of prediction equations to compensate for varying levels of evaluation is necessary if the prediction equations are to be of maximum value in counselling students. Stating this last point conversely, if university admission data are to have maximum guidance value, they must be supported by a continuous admissions research program.

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TEACHER LEADER BEHAVIOR AND ITS RELATION TO EFFECTIVENESS AS MEASURED BY PUPIL GROWTH

T. B. GREENFIELD

J. H. M. ANDREWS

The basic problems in the evaluation of teachers may be seen to lie in a small but critical number of issues. The first problem is to identify the factors which are causative or predictive of teaching success. Secondly, criteria must be established by which the success of the teacher can be judged. Finally, there is the need for a general theory or framework within which research may proceed. Pervading all these problems is a general one connected with the construction of satisfactory instruments of measurement and the development of techniques for their application.

I. Theoretical Background

A framework for teacher effectiveness is suggested by Mitzel (1957) and Figure I is based upon this model. It is apparent from this model that behavior is influenced by a number of prior variables only one of which is the teacher and the characteristics associated with him. Effectiveness, in this model, is defined in terms of the goals of a given system of education. It may be presumed that for different goals, different patterns of behavior are appropriate and that even for a single goal, various patterns of behavior may be equally effective.

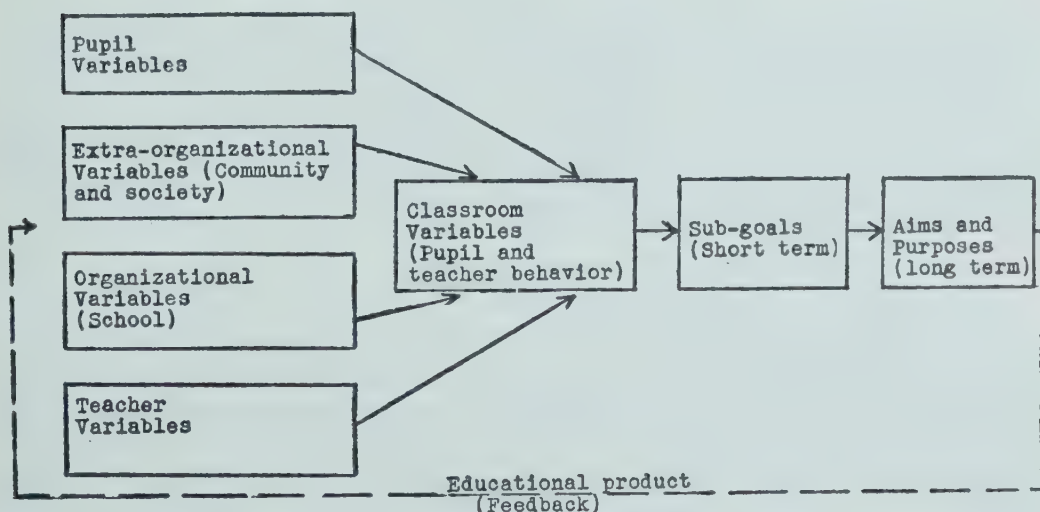


FIGURE I
A Model for Teacher Effectiveness

Effectiveness

From this model, teacher effectiveness may be defined as the degree to which a teacher produces changes in pupil behavior consistent with an external goal.

Leader Behavior

Among the many kinds of behavior which are to be found inside a classroom, the integrative, goal-directed kinds of behavior associated with leadership are likely to be prominent. Since teachers have an appointive headship in classrooms, the leader behavior of the teacher may be expected to have a significant and powerful effect upon other kinds of behavior and upon results associated with those behaviors. In empirical studies of leadership, the framework provided by the Ohio studies of leadership is probably the most useful presented to date (Stogdill and Coons, 1957). This extensive study of leadership has resulted in a remarkably simple instrument known as the Leader Behavior Description Questionnaire (LBDQ). This instrument has been shown to be high in both reliability and validity in describing the behavior of persons in positions of formal leadership.

The Ohio project began with the purpose of studying *what* a leader does and *how* he goes about doing it. That is, the work began with a minimum of assumptions about what leadership is and how it functions. The working definition of leadership stated that leadership "is the behavior of an individual when he is directing the activities of a group toward a shared goal." The LBDQ is the result of the study of *how* the leader functions. Two aspects of leadership are identified in this instrument and these are considered basic and independent dimensions of leadership. One of these, Initiating Structure, is defined as directive, goal-establishing behavior oriented to formal, institutional demands. The other, Consideration, is defined as behavior oriented to the maintenance of personal security, friendliness, and satisfaction in group processes. Effective leadership is considered to be that which manifests both of these aspects of leadership.

II. The Problem

The problem of this study is to relate the behavior of teachers as leaders to pupil growth as measured by achievement on examinations. In this case, the goals implied by effectiveness are those of the Alberta curriculum; and it is further assumed that the Grade IX Departmental examinations are a measure, at least in part, of the degree to which those goals have been achieved. The major hypotheses of the study are as follows:

H₁: Teacher leader behavior is positively related to pupil growth.

H₂: There is significant agreement among the judgements of principals, other teachers, and students about teacher leader behavior.

III. Growth Measures

One of the sub-problems of the study was to derive a measure of pupil growth or achievement. Since pupil ability plays a large part in accounting for achievement levels, an index of growth was sought which would not include that part of achievement attributable to ability. A measure of pupil ability was obtained by using the Cooperative School and College Tests (SCAT). A predicted class achievement mark was obtained from a regression equation based on observed class achievement and class ability. In other words, observed class ability was used to predict class achievement.

To derive the index of growth, differences between actual and predicted class achievement were compared ($Y - Y'$). To make these differences comparable between classes, they were divided by the standard error of the predicted Y' . Thus the growth index of a class is defined as the difference between predicted and actual achievement divided by the standard error of the predicted achievement:

$$G = \frac{Y - Y'}{S.E._{Y'}}$$

This technique is based upon a discussion of the standard error of the predicted Y' found in Garrett (1958, pp. 60-2), Guilford (1956, pp. 372-3), and Ferguson (1959, pp. 223-4).

IV. The Method

The study involved fifty-one teachers of Grade IX and the pupils in their classes. Only teachers of Social Studies or Mathematics were used as subjects in the study. The leader behavior of these teachers was described by three groups of persons: the principal in the school, five other teachers in the school, and then ten students in each teacher's class. In the case of the other teachers and students, the rating of leadership was an average derived from these groups. Thus for each teacher, three independent ratings of leader behavior were obtained. The instrument used to describe leadership was the Teacher Leader Behavior Description Questionnaire (TLBDQ) which is an adaptation of the Ohio LBDQ (McBeath, 1959, 1960). The leadership data were collected from three urban Alberta school systems. Pupil ability and achievement data were collected from the Alberta Department of Education.

The data were analyzed by both parametric and nonparametric methods. The pattern of findings was confirmed in both methods,

though in particular instances the non-parametric analysis performed less strongly than the parametric. Since parametric methods yield the most powerful and useful results, the findings reported here will be largely those of the parametric analysis.

V. The Findings

The findings of the study are centered around teacher leader behavior as Initiating Structure (S-score) and Consideration (C-score). These two dimenions are examined for consistency between raters and for their relation to growth.

Teacher Leader Behavior

A descriptive analysis of the leader behavior of teachers is presented in Tables I and II. It is apparent that teachers and students present a decided negative skew in the distributions of their ratings. At the same time, the distributions of ratings based on principals' judgement are symmetrical and near normal. Moreover, principals' ratings are higher and made over a wider range indicating greater differences in their perception of teacher behavior than either the other teachers or students are willing to accord the same behavior. No attempt was made to go beyond the usual descriptive statistics with these distributions since the purpose of this study does not include the investigation of the possible significance of such differences as do appear.

However, agreement among judges is of importance to the study. The overall consensus among judges is reported in Table III and is

TABLE I
MEDIAN, QUARTILE POINTS, QUARTILE DEVIATIONS,
MEANS, AND STANDARD DEVIATIONS FOR THE C-SCORES
OF FIFTY-ONE TEACHERS AS DESCRIBED BY PRINCIPALS,
OTHER TEACHERS, AND PUPILS

	Principals	Other Teachers	Students
Q ₃	49	46	46
Q ₂	43	43	43
Q ₁	37	39	37
Q	6.0	3.5	4.5
M	43	42	41
S.D.	7.6	5.3	5.8

shown to be significant. A clearer picture of this agreement may be gained from comparing the judges' ratings two at a time for each of the dimensions of leadership. Tables IV and V report the agreement among judges as Pearson *r*'s. In each case, students and principals are farthest apart in their descriptions of leadership with the other teachers occupying a central position.

TABLE II
MEDIAN, QUARTILE POINTS, QUARTILE DEVIATIONS,
MEANS, AND STANDARD DEVIATIONS FOR THE S-SCORES
OF FIFTY-ONE TEACHERS AS DESCRIBED BY PRINCIPALS,
OTHER TEACHERS, AND PUPILS

	Principals	Other Teachers	Students
Q ₃	50	50	45
Q ₂	46	47	43
Q ₁	41	44	40
Q	4.5	3.0	2.5
M	46	46	42
S.D.	7.7	4.7	4.4

TABLE III
CONSENSUS AMONG JUDGES ON RATINGS OF
LEADERSHIP DIMENSIONS

Judges	C-Score	S-Score
Principals, Other Teachers and Students .....	.69**	.67**

**Kendall's coefficient of concordance, W, significant at .01 level.

TABLE IV
PEARSON *r* CORRELATIONS BETWEEN JUDGES'
DESCRIPTIONS OF CONSIDERATION

	Principals	Students
Other Teachers .....	.65**	.67**
Students .....	.43**	.....

**Significant at .01

TABLE V

PEARSON r CORRLEATIONS BETWEEN JUDGES' DESCRIPTIONS OF INITIATING STRUCTURE

	Principals	Students
Other Teachers .....	.57**	.74**
Students .....	.44**	.....

**Significant at .01

Leadership and Growth

The relation of leadership to growth may be examined in two ways. First the dimensions of leadership may be compared singly with growth. Secondly, the dimensions may be compared jointly with growth. This last method is, perhaps, the most satisfactory one since leadership theory postulates that both dimensions must be high to achieve effective leadership.

When the dimensions are considered separately, each is significantly related to growth. Moreover, leadership ratings by each group of judges yields significant relationships with growth. Initiating Structure as judged by other teachers and students reaches .01 significance while the other categories attain the .05 level. These results are reported in Table VI.

The method selected to relate the two dimensions of leadership jointly to growth was multiple correlation. Thus, Consideration and Structure are used as independent variables and growth as the dependent variable. Since R, the multiple correlation coefficient, is subject to inflation, a corrected multiple correlation, r_{gc} , was also

TABLE VI

CORRELATIONS OF GROWTH INDICES WITH THE LEADERSHIP DIMENSIONS OF CONSIDERATION AND INITIATING STRUCTURE

	Correlation r_{gc}	Correlation r_{gs}
Principals .....	.26*	.28*
Other Teachers .....	.24*	.44**
Students .....	.25*	.43**

*Significant at the .05 level

**Significant at the .01 level

calculated. Both R and cR are reported in Table VII. The leadership ratings of students and other teachers are significantly related to growth but the ratings of principals do not reach the level of significance.

TABLE VII
MULTIPLE CORRELATIONS OF GROWTH WITH
CONSIDERATION AND STRUCTURE*

	$R_{g,cs}$	cR
Principals .....	.31	.25
Other Teachers .....	.45**	.41**
Students .....	.44**	.40**

*g—Growth c—Consideration s—Structure
**Significant at .05

The meaning of the multiple correlations may be more clearly seen in Table VIII which reports coefficients of multiple determination. In other words, the coefficients give the proportion of variance which is associated with each of the leadership dimensions. For other teachers and students approximately one-fifth of growth variance is associated with leadership with by far the greater proportion of this being related to Structure. Consideration contributes only some 2% of growth variance.

TABLE VIII
COEFFICIENTS OF MULTIPLE DETERMINATION USED
IN PREDICTING GROWTH FROM CONSIDERATION AND
STRUCTURE

	Principals	Other Teachers	Students
Consideration	4.16%	1.61%	1.77%
Structure	5.6 %	18.2 %	17.1 %
Combined	9.76%	19.8 %	18.9 %
$R_{g,cs}$ .....	.31	.45*	.44*

*Multiple R's significant at .05

VI. Discussion

An important question raised by the findings of the study is the relative importance of the two leadership dimensions as predictors of growth. It has been mentioned that they are associated with approximately 20% of the variance in growth. In assessing the importance of this contribution to growth, it should be borne in mind that such potentially powerful factors as previous pupil learning, total school environment, socio-economic background, motivation, teacher experience, and teacher training were not controlled. These factors were not controlled partly because of the difficulty of making controls on such pervasive factors and partly because it was the purpose of this study to focus upon leader behavior. That a single aspect of teacher behavior should emerge as a measurable and significant factor is an indication of its importance in the school setting.

The question is also raised of differences between the dimensions of leadership as predictors of growth. Consistently throughout the study, Consideration has occupied a position of less significance than Structure. However, the contribution of Consideration is there to a significant degree. When it is recalled that the growth criterion was based on a set of province-wide examinations emphasizing basic and fundamental learnings, it is perhaps not surprising that Structure, the "hard" aspect of leadership, is of greater significance in predicting growth than Consideration. With other criteria of growth the outcomes of such a study might be considerably altered.

Another area of interest raised in the study is the agreement between the judges in describing leadership and the degree of success attained by each in predicting growth. Although the distributions of leadership derived from each group of raters have characteristics of their own, there is a substantial amount of agreement among them. However, as predictors of growth the group of principals performed less strongly than other teachers and students. In the powerful multiple correlation, the principals were unable to predict pupil growth through their judgement of teacher leader behavior. Thus, although the principals represented in the study produced ratings with high face validity (greater range and more nearly normal distribution), the results were less significant in terms of pupil growth than judgements of teachers and students.

However, one should be wary about generalizing about judgements of principals from the results in the present sample. The number of principals represented in the sample was only 19 and they were using an instrument intended to be used in conjunction with the judgements of a group of like persons. The superior success of

students and teachers may be due only to the greater reliability of group rating over single judgements. Nevertheless, in the common practice of rating teachers, such rating is almost invariably the product of single judgement. It has been argued that since this single judgement is based upon frequent observation, mature judgement, and long experience that the results acquire validity. This validity is not reflected in the case of a small sample of principals rating the leader behavior of their teachers.

VII. Conclusions

1. There is a significant agreement among principals, other teachers, and students in their descriptions of teacher leader behavior.
2. Teachers showing a high degree of leadership tend to induce high achievement in their pupils.
3. Initiating Structure as a dimension of leadership is more strongly related to pupil growth than is the Consideration dimension.
4. Group ratings of leadership based on other teachers' and students' judgements were more successful in predicting pupil growth than the single ratings of principals.

VIII. Implications

This study has obvious implications for the training of teachers, their selection for positions, and the evaluation of their work. However, before such practical applications can be considered, many questions about leadership and growth remain to be answered. This study was carried out within a specific and rather narrowly defined set of educational objectives. Moreover, it was limited to two school subjects and to a single grade level. Further studies are required, therefore, to clarify both leadership and growth. The TLBDQ has shown itself to be a successful research instrument, though it is not without limitations; its direct application in evaluation of teachers would be neither desirable nor practical.

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LEADER BEHAVIOR IN SOCIAL SYSTEMS

STEPHEN P. HENCLEY

*University Council for Educational Administration
Columbus, Ohio*

An important axiom of educational administration is that the administrator should know and understand the social system in which he functions. The axiom implies that administrators should be aware of the expectations held by reference groups with respect to education in general, and with respect to the administrator's role in particular. As Campbell states,

If the school superintendent had but one public to deal with his task would be relatively simple, but this is not the case. In each school community there are many publics. These publics may differ by way of occupation, income, politics, religious affiliation, organizational membership, residential area, national background, race, and other factors It may be that in the number and diversity of his publics the school administrator stands in a unique position among other administrators. This position becomes even more complex when we begin to assess the various expectations which many of these publics have for school and school administrators (4).

Moreover, school administration does not deal solely with matters related to buildings, money, organization, legal provisions, and the like, even though much of the literature may suggest this. As Campbell goes on to point out, "School administration also deals with the values, beliefs and feelings of people (4, p. 128).

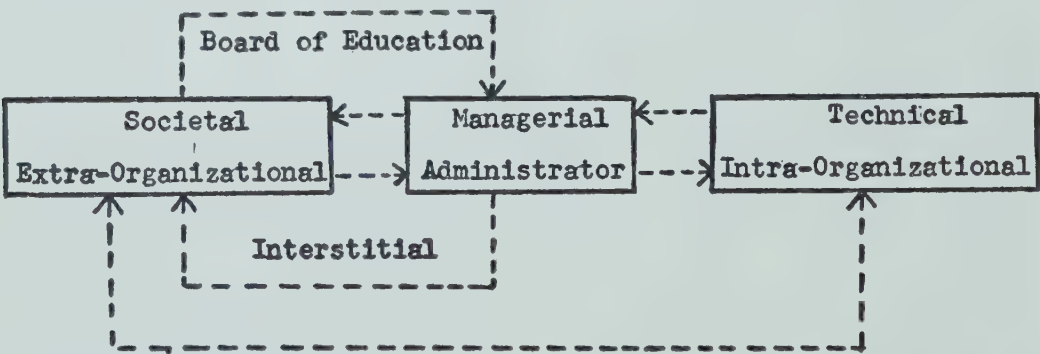
Counts, in discussing the role of the superintendent, notes that the administrator must possess a clear vision of not only his own values but also those of the society he serves if he wishes to achieve the statesmanship level in his profession (6). Furthermore, "the superintendent should know his community. He should know something of its history, particularly with reference to its conception of public education. He should strive to know it as a whole in its traditions and values, its prejudices and idiosyncracies" (6, p. 86).

Role theory as developed by Parsons, Shils, and others (19) suggests that the administrator's reference groups will vary in the expectations held for the administrator's role. In broad terms, role theory maintains that almost any activity of any individual may be viewed as being in conformity with or in opposition to the expectations of his role. These expectations include not only his own concept of his role but also the role expectations of others relative to his behavior in the role which he occupies. The role may thus be defined as the complex of specific activities and behaviors imposed upon a person who occupies a particular

position in a social system. Linton (14) points out that a social system is made up of statuses or positions which are accompanied by rights and duties defined in terms of expectations for behavior on the part of the individuals occupying such positions. That role behavior is attached to a particular position within a social system is also supported by Newcomb (18). Parsons (20) states that the positional aspect of an individual in a social system is his status, whereas what the individual does while holding this status is his role.

The collectivity of individuals and groups with whom the superintendent interacts while maintaining the school organization may be viewed as a social system possessing collective and shared goals. This social system is composed of roles which are interrelated, interlocking, and interacting. It may be said that roles form the basis for ordering social systems by serving to clarify and to make meaningful the functions and tasks of individuals comprising the system. The totality of the roles of a formal social system represents the functional human resources available for accomplishing the purposes and goals for which the system came into being.

The superintendent of schools has a unique role in the social system depicted in Figure 1. He is not only responsible to the board of education; he must also assist this body in the formulation and implementation of its policies. At the same time he must be responsive to the feelings, values, and wishes of both intra-organizational and extra-organizational individuals and groups. It is no wonder that he may be, and often is, confronted with differing role-expectations as he attempts to discharge his multiple leadership responsibilities.



Role theory suggests that if the administrator acts in conformity with the role-expectations of the individuals and groups comprising this social system, he tends to have their sanction and approval. Conversely, to the extent that he deviates from their role-expectations, he faces censure and disapproval. The difficulty of

the superintendent's position is apparent when we consider the number of groups which may hold varying expectations for his behavior.

Since his role is complex, and his reference groups many, the possibility of conflict relative to expectations for the superintendent's role is an ever-present hazard. Campbell, for instance, mentions several types of conflict that may confront the superintendent. One of these is the conflict which results from expectations which may require a superintendent to behave in a manner contrary to what he himself believes is correct and appropriate behavior (4, pp. 259-261). Bidwell, too, mentions that a person joining an organization may bring with him certain behavior-determining elements which may conflict with the expectations of the organization (1). Chase suggests that individuals make evaluations of leadership on the basis of three factors: their perception of what the situation requires, their own and others' roles, and their own and others' needs (5).

The perception of others relative to a superintendent's behavior appears to play a significant role in fulfilling role-expectations. Psychologists and sociologists point out that individual and group attitudes and values extensively affect our perceptions of observed phenomena. Indeed, neither accurate knowledge nor first-hand experience may be sufficient to correct mis-perceptions, for changes in attitude and sentiment do not necessarily follow modifications in an individual's cognitive structure. It may be correct to say that perceptions of the superintendent's role-behavior are affected by at least the following factors: the actual role itself; beliefs, attitudes, needs, and values; personality and other psychological variables; and the nature of the observed and recalled phenomena. With the number of factors operating to influence role-perception, it may well be that the degree to which there is congruence between role perception and role expectations may be the degree to which the superintendent is able to satisfy the role-expectations of his several alters. Furthermore, the extent to which a superintendent is able to perceive, cope with and resolve conflicting role expectations may well determine his effectiveness and efficiency, for his own accomplishments are often circumscribed by the role-expectations and the role-behavior of others. As Linton states,

The individual . . . finds himself frequently confronted by situations in which he is uncertain of both of his own statuses and roles and those of others. He is not only compelled to make choices but also can feel no certainty that he has chosen correctly and that the reciprocal behavior of others will be that which he anticipates on the basis of the statuses which he has assumed that they occupy. This results in numerous disappointments and frustrations (15).

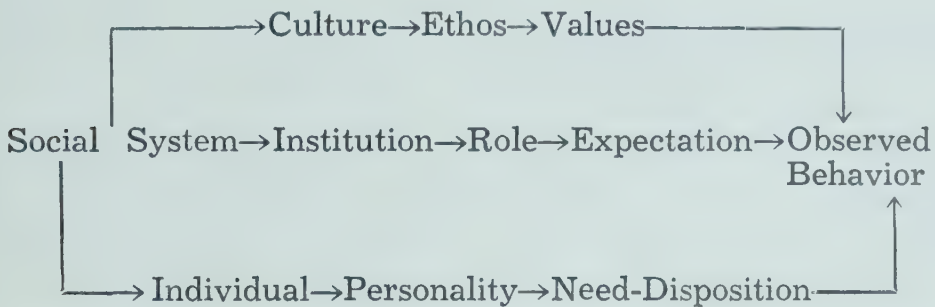
Campbell supports Linton's view when he says,

. . . In a sense these conflicting expectations among reference groups place the school administrator squarely in the middle . . . a superintendent may find his board of education holding one set of expectations for him while his staff holds another. This is not merely a theoretical matter: it is one which has been documented time and again in practice (4, p. 142).

Theory and Research

During the past decade, a sizable number of theorists, writers, and researchers have focused attention upon conflict within social systems. As a result, both leader behavior studies, and psychological and sociological role theories are offering useful frameworks for viewing role behavior in leadership positions. David Riesman, for instance, has enunciated three ways in which social conformity behavior may be generated: through tradition-direction, through inner-direction, and through other direction (21). Riesman's thesis that inner-direction is gradually being supplanted by other-direction suggests a gradual but definite change in American value orientations which appears to have special significance for the role behavior of leaders. If other-direction is indeed receiving increased sanction in American society, leaders will require more accurate knowledge of the nature of the beliefs, attitudes, and values of the individuals and groups with whom they interact. For school superintendents a shift toward other-direction underscores the importance of accurate knowledge and understanding of these variables as they are manifested by their intra-organizational, extra-organizational, and interstitial reference groups. It is evident, too, that if other-direction is becoming a sanctioned pattern for a large segment of society, the expectation of this segment will be that the wishes of others should receive careful consideration in decision-making at leadership levels. The expectation is, clearly, that decision-making should become more and more tempered by the wishes and values of the leader's important reference groups. This is not to say that decision-making will be entirely determined by these variables; it does imply, however, that the emerging expectation is that these factors should receive careful consideration in the decision-making deliberations of persons in leadership positions. Riesman's thesis suggests the primary importance of accurate perception on the part of leaders with respect to alter-group expectations for leadership positions. The effectiveness and efficiency of leaders, their ability to function with a minimum of conflict, and their success in coordinating the efforts of individuals and groups toward common goals may be determined, in large measure, by two factors: first, the ability of the leaders to perceive reference-group expectations accurately; second, the ability of leaders to satisfy and modify these expectations while moving the organization forward toward its goals.

Theorists such as Getzels and Guba (9) maintain that administration is a social process with clearly defined characteristics. Structurally, administration occurs as a hierarchy of subordinate-superordinate relationships within a social system. Functionally, the administrative process consists of the allocation and integration of roles and facilities for the achievement of the goals of the system with reference to a broader cultural framework. Operationally, administration takes place in an inter-personal setting and is invariably concerned with social relationships. Viewed in these terms, behavior in social systems is a function of the interaction of several classes of independent phenomena. Getzels' recently extended theoretical model points to three such classes:



The model, which shows the nomothetic and idiographic dimensions of social behavior, suggests several types of conflict to which role incumbents in social systems may be subject: conflicts in values, role-personality conflict, role conflict, and personality conflict. Moreover, the recent addition of the third dimension "culture ethos values" makes the model useful for explaining extra-organizational as well as intra-organizational relationships in school administration.

Leader Behavior and Reference Group Expectations

Recent studies based on theoretical formulations have documented the varying leadership styles exhibited by leaders; the varying expectations held for leader behavior by different reference groups; and the results of leader behavior which was at variance with reference group expectations.

1. Research has confirmed that leaders exhibit different but characteristic leader behavior styles. Using the Getzels' model as the basis for investigating relationships between the behavior of superintendents and principals, Moser's (16) study concentrated on three different styles of leader behavior. The *nomothetic style* was characterized by behavior which stressed goal accomplishment, rules and regulations and adherence to the principle of centralized authority at the expense of the individual. Effectiveness was rated

primarily in terms of behavior directed toward accomplishing the school's objectives. The *idiographic style* was characterized by behavior which stressed the individuality of people, minimum rules and regulations, decentralized authority, and highly individualistic relationships with subordinates. A primary objective was to keep subordinates happy and contented. The *transactional style* was characterized by behavior which stressed goal accomplishment, but which also made provisions for individual need fulfillment. Nomothetic and idiographic behavior were balanced and each style was judiciously utilized as the occasion demanded.

Similarly, Andrew Halpin (12) was successful in delineating four different leadership styles in terms of two leader behavior dimensions: *initiating-structure-in-interaction* (the leader's propensity to structure relationships with staff members and his ability to define patterns of procedure, organization, and communication); and *consideration* (the leader's propensity toward mutual friendship, respect, and trust in relationships with staff members). Halpin showed that reference groups perceived some leaders to be high on both dimensions. Other leaders were perceived as low on both dimensions, while still others were perceived as high on one of the dimensions but low on the other.

2. Research during the past decade has also highlighted the fact that reference groups express conflicting expectations and preferences concerning leader behavior in social systems. Guetzkow, for example, found that leaders who exhibited marked authoritarian tendencies were "rejected by relatively many followers and accepted by relatively many superiors," (11). On the other hand, leaders who did not exhibit authoritarian tendencies were "accepted by relatively many followers and rejected by relatively many superiors." Fleishman's research in industry found that the attitudes of foremen relative to leadership and the management of workers were much more congruent with the attitudes of superiors than with the attitudes of subordinates (8). Turner's empirical research indicated that participatory leadership was superior to supervisory leadership in effecting changes in group attitudes (23). Halpin's study of Ohio superintendents, moreover, found that school staffs and boards of education perceived leader behavior differently with respect to *consideration* and *initiating-structure-in-interaction* (12, p. 78). School boards expressed a much stronger preference for superintendents who were high in *initiating structure* than did school staffs. In like manner, an Air-Force study reported by Halpin showed that leader behavior oriented toward *initiating-structure-in-interaction* correlated positively with effectiveness ratings of superiors (13).

Seeman, in studying role-conflict among school superintendents in Ohio, stated that contradictory expectations of alter groups placed institutional leaders in a position in which they were especially vulnerable to attack or conflict along four dimensions: (a) the status dimension, (b) the authority dimension, (c) the institutional dimension, (d) the means-end dimension (22). Moreover, when the extent of agreement on role definition for school superintendents and board of education members as defined by role incumbents was studied by Gross (10) and others, it was found that (a) 71 per cent of the superintendents perceived conflicting expectations for their behavior with respect to selection and promotion, and (b) 88 per cent sensed conflicts with respect to their roles in salary recommendations.

3. What are the results of conflicts that develop because of incongruence in expectations for leader behavior? Several studies have noted that such conflicts markedly influence satisfaction, effectiveness, confidence in leadership, and attitudes toward the work situation. Ferneau, in a well-designed study, investigated the interaction of school administrators and consultants to determine if any relationship existed between role-expectations and the perceived effectiveness of consultants. Using various role categories for consultants such as the expert, the process person, and the resource person, Ferneau found that when administrators and consultants agreed concerning expectations, the consultations were deemed successful (7). However, if no agreement was reached concerning expectations, the consultations were viewed as unsuccessful. Moyer (17) used a similar study to investigate leader behavior by focusing upon attitudes toward authority. This study of leadership-centered attitudes and group-centered attitudes resulted in a conclusion which parallel Ferneau's: favorable attitudes toward the work situation were engendered when principals and teachers agreed on role-expectations for the leader. Similarly, Brown and Neitzel (2) reported that morale tended to suffer if discrepancy existed between an alter-group's definition of a leader's role, and the role as it was perceived by the leader himself.

Further support for these findings was given by Campbell's (3) study. Campbell reported (a) that teachers whose wants and needs agreed with their principals' expectations expressed significantly higher job satisfaction than did teachers whose wants were in conflict with the principal's definition of the teacher's role; (b) that when principals designated the effectiveness of teachers, the effective teachers were those whose wants and needs were similar to the principals' expectations, and (c) that teachers whose wants and needs were in agreement with the expectations of the principal ex-

pressed more confidence in the leadership of the principal. Moser (16) has also reported that high mutual ratings of effectiveness and confidence by superintendents and principals were accompanied by similarities in leadership style, feelings of security, general satisfaction with relationships, desire to consult with one another on important matters, and clear delineation of duties and authority for decision-making. Conversely, the absence of mutual ratings of effectiveness and confidence was accompanied by confusion, lack of security, general dissatisfaction with the relationship, poorly defined duties, and poor delineation of authority for decision-making.

Leader Behavior, Perception, and Values

Most of the studies cited above were concerned with role-expectations and conflict as they pertain to the administrator in interaction with intra-organizational or interstitial reference groups. Little reference was made to role-expectations of extra-organizational groups or to the possibility that conflict may exist between the administrator and these groups. To exclude extra-organizational groups from the social system in which the administrator functions, however, violates the unity of the administrator's role at most levels, and particularly at the superintendency level. Observation confirms that much of the superintendent's work lies in the area thus excluded: in working with various community groups and individuals about matters that are essential for maintenance of the school organization (27). The superintendent interacts at times with intra-organizational reference groups, at times with interstitial reference groups, and at times with extra-organizational reference groups. No one of these groups has a monopoly on the expectations generated for his behavior; he must be prepared, in his position, to cope with expectations emanating from all three.

Although there is little reported research concerning the expectations of extra-organizational reference groups for leader behavior in school organizations, some recent studies appear to indicate that accuracy of perception and an understanding of values will enhance the administrator's effectiveness and efficiency in dealing with community groups. Getzels (26), for example, has suggested that difficulties in interpersonal relationships arise not so much from complexities and differences in values that are in the open and understood, as from complexities and differences that are underground and misunderstood. In like manner, Steiner in reporting on interpersonal behavior as influenced by accuracy of social perception found that co-ordinated collective action required each participant to take the role of the other in order to gain insight into the other's intentions and preferences (31). When role occupants were motiv-

ated toward co-operation and had freedom to alter behavior as a result of their perceptions, correct social perception assisted group efficiency and interpersonal competence (31, p. 291).

Several recent studies appear to corroborate the above findings as they relate to the educational setting. Sletten (30) reported that a great deal of the conflict associated with superintendent-board of education relations has its source in attitude and value differences. McPhee (29) found that congruence in educational viewpoint between community respondents and the superintendent of schools was related to the degree of school approval manifested by the citizens. Similarly, DeGood (25) reported a close association between effectiveness rankings of superintendents and the precision with which these chief executives perceived the prevailing educational viewpoints and attitudes in their communities. In a study of the relationships between values, value-perceptions, and confidence in leadership Abbott (24) found that similarity in value-orientations and accuracy of perception concerning value-orientations affected the ratings of confidence which school boards gave with respect to their superintendents of schools. My own study (28) showed that misperception played a prominent role in increasing the conflict with which superintendents saw themselves confronted. A conflict typology constructed on the basis of conflicting superintendent-reference group perceptions and expectations revealed that superintendents exhibited three major conflict tendencies. One tendency of superintendents was to be *Innocent*: they tended to believe that no significant differences existed between their own views and the views of others when, in fact, such significant differences existed. Second, superintendents tended to be *Keen*: they accurately perceived and defined reference-group expectations even though they did not concur with these expectations. Finally, superintendents tended to be *Trouble-Seeking*: they saw conflicts where none existed. Although the reference groups agreed with the superintendents on issues which occasioned this conflict type, the superintendents did not perceive this agreement. They attributed beliefs to the reference groups which were in opposition to their own.

Implications For Training

Research in the past decade has stressed the social context in which administrators function; particular emphasis has been placed upon the complex social phenomena which impinge upon the administrative setting to create problems and ambiguities requiring decisions and solutions. Both research and observation have tended to confirm that the situational context of administration is not only dynamic but often turbulent: there is a continuous interplay of social, cultural, political, psychological, anthropological, spiritual,

and economic forces. Such dynamic elements, singly and in combination, comprise a total field of forces that create and underlie the complex and kaleidoscopic social phenomena surrounding administrators in social systems.

If administrators are to function with a maximum of effectiveness and efficiency much of their training should be directed toward improving their understanding of social systems they will encounter upon appointment. The conceptual horizons of candidates should be broadened to encompass the totality of such systems: intra-organizational, interstitial, and extra-organizational. The administrator will require technical competencies to be sure. However, social, process and conceptual competencies will be of equal importance. The model on the following page suggests that social science concepts and interdisciplinary content may play a major role in developing such competencies. Certain assumptions are basic to this model: (1) phenomena occurring in social systems are complex, but they are rarely random or haphazard; (2) social system phenomena are the product of the interaction of dynamic elements which comprise the total field of forces characterizing social systems: (3) since social system phenomena are seldom random nor haphazard, it may be possible to order and to understand them.

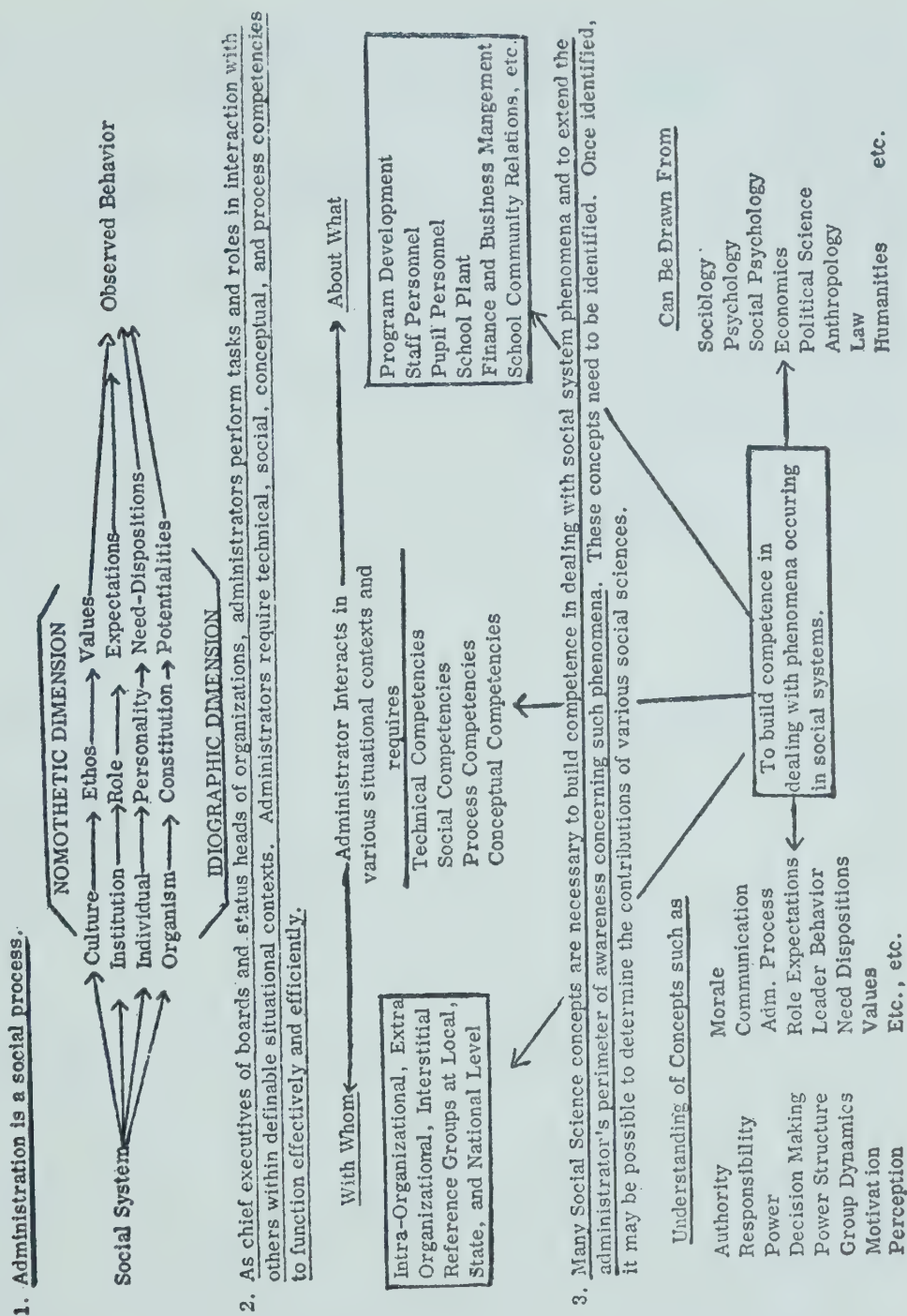
The model espouses the basic view that social science concepts provide alternative ways of reviewing the total field of forces that underlie social phenomena in social systems. Concepts provide ways to dimensionalize reality and to order the real world: they provide complementary and alternative "cognitive maps" for viewing complex social phenomena. The administrator who is able to dimensionalize reality in many ways is not only in a better position to understand social phenomena, but equally important, he is also more aware of alternative bases for action and decision-making.

It appears that certain aspects of the administrator's training should receive special emphasis.

Perception.—Capacity to become insightful with respect to social and group processes appears to be an important pre-requisite to administrator effectiveness and efficiency. Keen and insightful perceptual ability can do much to improve an administrator's capacity to function in a complex social system. Selection procedure should be developed to ensure the selection of candidates who possess much better than average perceptual and intellectual ability. Such abilities are necessary for those who seek insight into social and group processes necessary for effecting social change in a dynamic society.

Following selection, training programs should give increased attention to any perceptual "screens" which may result in insensitivity

INTERDISCIPLINARY CONTENT AND ADMINISTRATOR TRAINING PROGRAMS



to reality on the part of candidates in training. Handicapping perceptual screens should be removed through appropriate training and allied activities.

There are as many ways to approach this task as there are "ways of knowing". Basic disciplines such as psychology, sociology, political science, and others can do much to erase perceptual screens through the provision of concepts that widen the candidate's peri-

meter of awareness. Moreover, literature, history, and drama can do much to widen perceptual horizons and to increase the ways of knowing. Finally, carefully structured observation, field study, and guided internships may all contribute to this end.

Motivation.—Persons charged with responsible positions in social systems must be aware of both value patterns and the motivators of individual and group beliefs and actions: psychological, sociological, anthropological, and spiritual. Training programs should attempt to remove the “blind spots” of trainees in these areas. Again, broad acquaintance with the basic disciplines and the humanities usually leads to increased awareness of both value patterns and the factors which motivate group actions. In order to perceive reality accurately, it may be necessary for administrators to view the world through many sets of spectacles—those of the psychologist, the sociologist, the historian, the novelist, the political scientist, to mention a few. Moreover, deliberate and purposeful exposure in the arena of conflicting community values and beliefs appears essential to administrators in training.

Communication.—Although administrators spend nearly ninety percent of their time in talking and listening, recent studies tend to indicate that communication between superintendents and others often tends toward mediocrity. Since much of the administrator’s activity will centre in the area of communication as he interacts and interrelates with others in his social system, more effective means of communication appear vital for superintendents. Training programs should direct increasing attention to the development of administrator competence in this critical area.

Group Dynamics.—The nature of the administrator’s position demands continuous interaction with many types of groups. Group leadership skills appear essential. To develop these skills, however, the administrator must understand the dynamics of group action and the processes by which groups can be made purposeful and cohesive. Such understanding is necessary if administrators are to unify and harmonize reference group expectations.

Power Structure.—All social systems are based upon some system of power and exhibit complicated webs of sociometric networks. The administrator’s effectiveness as he functions in a social system which is characterized by formal and informal hierarchies of power, prestige, and influence, will be determined in large measure by factors already mentioned: his ability to perceive clearly, his ability to communicate well, his skill in group processes, his ability to value patterns and motivating forces, and his ability to use cognitive maps to dimensionalize reality in a variety of ways.

Decision Making.—Most decisions in the administrator's social system will be made on the basis of an experiential background in a context of power. There will be a constant matching of alternatives, and a constant attempt to predict the results of decisions. Perception, motivation, communication, group dynamics, power structure and the effective use of cognitive maps will all tend to influence and temper decision making. Moreover, it is doubtful whether effective decision-making is possible without consideration of all these factors.

Leader Behavior.—Each of the above components will determine in some degree the extent to which the administrator can function effectively and efficiently as a leader in making and implementing decisions while maintaining cohesion and purpose in groups with which he interacts. Moreover, the extent to which he can do these things without undue conflict will be determined largely by his perspicacity and his understanding of the components outlined.

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BOOK REVIEW

"University Adult Education: A Guide to Policy"

by

Renee and William Petersen

(Harper 288 pp. \$5.50)

University Adult Education: A Guide to Policy is, as Roland R. Renee, President of Montana State College comments in its foreword, "an important and disturbing book". Stemming out of a specific study instituted on that campus, the book surveys the experience of other institutions in this university function which has been a matter of debate on many a campus. The Petersens take us on a tour of adult education emphasizing its significance and pinpointing its problems in terms of the rapidity of change which characterizes our time and the mixed achievements of other parts of the educational system. While oriented to American experience and institutions, its observations are generally pertinent to Canada.

The core of this survey is a consideration of principles and policy in the administration of adult education. The authors, alarmed about the content of university adult education point to low-level, poor quality fare which they say is too often offered to adults. While conceding an important role for the university in adult education, they argue for the use of the university's resources in programs which maintain the standard of the traditional academic disciplines. Further, the Petersens suggest there must be a clear limit to the recognition of the community's demands on the university whose reservoir of scarce skills and facilities is small.

The authors analyze the often obvious separation between the traditional program of the university and its adult education operation and suggest certain requirements for a more effective integration of the two. This internal relationship and as well, the character of the university's adult education program, is connected to the underlying problem of finance on which the Petersens offer some refreshing and down-to-earth advice.

University Adult Education provides an excellent review of available literature and current opinion on the subject. It is unfortunate that thinking and practice from non-university adult education has been rather inaccurately connected to the adult education work on campus. Unfortunately too, the book, with regrettable consistency, emphasizes the negative. Were the authors to have drawn

more readily for illustration from some of the imaginative and first class adult fare which American institutions currently offer, their survey would have been perhaps more constructive and certainly more accurate.

Nevertheless, as a chart against which the adequacy of the university extension operation can be compared, the survey is thought-provoking and stimulating. It will be of interest to all concerned with adult education activity but of particular value to the university administrator.

Duncan Campbell.

ANNOUNCEMENT

The Alberta Advisory Committee on Educational Research, in keeping with its policy of publishing research findings of interest to educators and those interested in school problems, is pleased to announce the publication of five new Monographs in Education.

Monograph 2: School Examination Practices and Standards in Alberta. (MacArthur and Hunka) Price: \$2.00

Monograph 3: The Alberta Teacher Force in 1957-58. (MacArthur and Lindstedt) Price: \$3.00

Monograph 4: Theory and Practice Governing the Time of School Entrance. (Dey) Price: \$3.00

Monograph 5: Rural Alberta: Patterns of Change. (Uhlman) Price: \$3.00

Monograph 6: Pupil Personnel in Alberta Secondary Schools. (Black, MacArthur, and Paterson) Price: \$3.00

A limited number of Monograph 1: Composite High Schools in Canada (Andrews and Brown, editors; Price: \$1.00) are still available.

Persons wishing to order these Monographs may do so by writing to the Director, Alberta Advisory Committee on Educational Research, Faculty of Education, University of Alberta, Edmonton, Alberta. You are advised to order as soon as possible as only a limited number of copies of each monograph have been printed.

The Alberta Journal of Educational Research

Vol. VII, No. 3

September, 1961



THE COMMITTEE ON EDUCATIONAL RESEARCH
Faculty of Education
University of Alberta

ACKNOWLEDGMENT



This publication was made possible by funds granted by the Carnegie Corporation of New York. The Corporation is not, however, the author, owner, publisher, or proprietor of this publication, and it is not to be understood as approving by virtue of its grant any of the statements made or views expressed herein.

ABILITIES AND SKILLS AFFECTING ACHIEVEMENT IN SPELLING

BERTHA M. NEWTON

Faculty of Education

University of Alberta, Calgary

Of the subjects taught in the elementary school, spelling is perhaps the most frequently discussed by the public. In fact, academic proficiency is often judged by competency in this tool subject. Unfortunately, the level of achievement in spelling is often considered unsatisfactory. Because educators have been concerned about this lack of efficiency in spelling, many suggestions for its improvement have been offered to teachers. In addition, a noteworthy amount of research has been undertaken and a number of factors, or abilities and skills, that affect achievement in spelling have been identified. These factors appeared to form the following five groups:

1. Spelling achievement and intelligence
2. Spelling achievement and perceptual abilities
3. Spelling achievement and word analysis abilities
4. Spelling achievement and reading abilities
5. Spelling achievement and language abilities.

In this survey each of the above categories includes the specific abilities and skills found to determine success in spelling.

Spelling Achievement and Intelligence

Some educators observed that certain children were extremely poor in spelling and studied the relationship of general intelligence to success in spelling. In studies of disabled spellers in grades two through eight, Hollingworth (55), Gates (32, 34, 35), Garrison and Garrison (30), Houser (59), Schonell (90, 91), Terman (99), Russell (86, 87, 88) and Guiler (48) each found a close association between achievement in spelling and general intelligence. In studies of high school and college students, Crook (22), Williamson (108), Murray (74), and Kiefer and Sangren (65) found the relationships between intelligence and spelling achievement somewhat closer. Guiler and Lease (49) discovered that pupils of low intelligence lacked ability to spell, but Palmer's (78) studies revealed that although low intelligence indicated inferior spelling ability, high intelligence did not guarantee superior ability.

Other educators investigated the relationship between achievement in spelling and verbal and nonverbal intelligence separately. Verbal intelligence may be described as ability to deal with abstrac-

tions expressed in words. It involves a knowledge of word meanings including ability to classify words according to meaning and to discover analogies in written expression. Nonverbal intelligence may be described as ability to deal with pictorial, diagrammatic, and numerical materials. It does not emphasize the knowledge of word meanings or require reading ability.

Gates (32, 34) investigated the relationships between achievement in spelling and verbal intelligence at the elementary school level while Holmes (56) obtained information for college and high school students. In each investigation a closer association was found between achievement in spelling and verbal intelligence than between achievement in spelling and nonverbal intelligence. Evidence from the research seemed to indicate quite definitely that intelligence, and especially verbal intelligence, determined to a certain extent achievement in spelling.

Spelling Achievement and Perceptual Abilities

Other educators, in an effort to gain a greater understanding of the spelling process, studied various perceptual factors including mental imagery, visual discrimination and perception, visual memory, auditory discrimination and perception, and auditory memory.

Some of the early investigators believed that the method that a learner used to enable him to reproduce word forms included mental imagery. They also believed that the teacher should have an understanding of the manner in which imagery was used in studying spelling words. Spindler however, (95) was of the opinion that there were different types of imagery as auditory, visual, motor, and mixed, and that individuals used one or another of these types. Kline (67) found that individuals preferred one of these types of imagery, but Abbott (3) and M. R. Fernald (28) discovered that visual imagery was most commonly used. Holmes (56) found that auditory images of words contributed independently to spelling ability. Holmes, however, did not include the visual aspects of imagery in his study. On the other hand, Kiefer and Sangren (65) and Carey (15) found no relationship between spelling achievement and imagery of any type.

Despite these findings, certain literature on the teaching of spelling emphasizes a need for the use of imagery. Grace Fernald (27), Fitzgerald (29), and Betts (10) explain that there is a need for the learner to recall the visual image of words. However, Gates (34) concluded that poor visual imagery was an indication of inadequate visual discrimination and perception. Following the same reasoning, poor auditory imagery would be an indication of inadequate auditory discrimination and perception.

Many educators studied various visual abilities and skills to determine those that might affect achievement in spelling. Carmen (16) discovered that success in spelling depended upon a special ability to notice differences in words, or visual discrimination and perception ability. Others, Gates (34, 35), Sister Mary of the Visitation (103), and Sister Mary Benedict Phelan (81) reached similar conclusions. In a study of readiness for spelling among grade two children, Russell (87) found that visual perception was pertinent to success. Templin (96) noted that deaf and hard of hearing children made fewer spelling errors in written paragraphs and exhibited superior visual perception abilities to children with normal auditory acuity.

Some experimenters improved accuracy of visual discrimination and perception abilities and noted the effects on spelling achievement. By using word discrimination exercises, Mason (69) and Higley and Higley (53) increased the ability of elementary school children to spell. Gilbert (41), Hansburg (50), and Zyve (116) used various methods of improving accuracy of visual perception and noted significant gains in spelling achievement. In some studies the gains were especially noticeable among the poorer spellers of the groups in the experiment.

Visual memory, the ability to remember the forms of words, was studied among students of elementary school, and college. Howell (60), Kiefer and Sangren (65), and McGovney (71) found that the better spellers were superior to the poor ones in their ability to remember word-like forms. However, Weislogel (106) discovered that this relationship did not exist when visual memory was tested by use of designs and numbers instead of word-like forms.

Certain auditory abilities, such as auditory discrimination and perception, the ability to note differences and similarities in the sounds of words, were believed to affect success in spelling. Templin (98) found that some children were unable to discriminate between identical and unlike syllables in words. Bradford (13) discovered that some children were less able to distinguish between certain letter sounds than others, but the ability increased from grade to grade. In addition, Zedler (115) noted an improvement in the spelling performance of grade two children with special training in auditory discrimination. Others, Damgaard (23) and Holmes (56) observed that those who could discriminate musical elements more accurately, were the better spellers. Despite these findings, studies of deaf and hard of hearing children by Gates (37) and Templin (96) revealed that children who lacked auditory acuity were superior in spelling to those who possessed normal auditory acuity.

The importance of auditory memory, or the ability to remember

sounds in words, was investigated. In studies conducted by Whitehead (107), Winch (109, 110), Pressy (82), McGovney (71), Durrell (26), Baker (7), and Garrison and Garrison (30) the best spellers obtained the highest scores on tests of auditory memory. They concluded that auditory memory was a factor which determined, to a certain extent, success in spelling.

Some researchers compared the effects of visual and auditory abilities on achievement in spelling. In studies of spelling disability, Schonell (90, 91) discovered weaknesses in both visual and auditory perception and considered them among the important causes of the deficiency. In addition, Nichols (75), Russell (87), and Hudson and Toler (61) observed that both auditory and visual discrimination were closely related to achievement in spelling. However, Howell (60), Kiefer and Sangren (65), and Hartmann (52) noted that visual abilities were more important to achievement in spelling than auditory abilities. Although there is some lack of agreement as to which of these abilities is a greater determiner of success in spelling, no study indicates that any one of these perceptual abilities is insignificant. The research evidence clearly indicates that visual discrimination and perception, visual memory, auditory discrimination and perception, and auditory memory are contributors to achievement in spelling.

Spelling Achievement and Word Analysis Abilities

Many educators believed that word analysis abilities such as phonetic analysis, structural analysis, and a knowledge of word derivation contributed to efficiency in spelling. Others were of the opinion that a knowledge of spelling rules also determined proficiency in this tool subject.

Several investigators found that knowledge of phonetic analysis, or the ability to associate sounds with the appropriate letters, was necessary for spelling competency. In studies of disabled spellers, Hollingworth (55) observed that inability to handle letter sounds was one of the outstanding causes of disability. Davis (24), Spache (93), Watson (105), and Wolff (113) studied spelling errors made by elementary school children, and found that a large proportion of the mistakes indicated a lack of knowledge of phonetic analysis. Other educators, Garrison and Heard (31) Palmer (78), McGovney (71), and Russell (86) all observed that proficiency was accompanied by ability to handle letter sounds. Studies by Templin (97), Rudisill (85), Aaron (1), and Durrell (26) all showed that children in the elementary grades who were proficient in phonic knowledge were also competent in spelling. In addition, Russell (87) noted that a knowledge of phonetic analysis was of value to

readiness for spelling in grade two. When poor spellers in high school as well as in the elementary grades received instruction in phonetic analysis, Baker (7), Gates (34), Luser, Stanton and Doyle (68) and Witty (111) noted improvement in their spelling ability. The value of the phonetic analysis seemed to lie in the type of program provided. Gates (34) observed that it was necessary to place emphasis on the appearance and sounds of letters, syllables, and words rather than on minute phonetic elements such as *sh*, *ch*, *ns*, *ill*, *ea*, etc.

Some studies revealed the fact that a knowledge of structural analysis, or the ability to identify syllables, was associated with achievement in spelling. Wychoff (114) investigated the procedures used by good and poor spellers as they learned spelling words and found that the best ones noticed groups of letters in words. By photographs of eye movements made while spelling words were being studied, Abernethy (4) and Gilbert (40, 42) discovered that the good spellers analyzed words by syllables or related parts of words, while the poor spellers seemed to have no organized method of approach. In addition, Watson (105) and Witty (111) attributed many of the spelling errors made by high school students to a lack of attention to syllables in words. Furthermore, Gates (34) and Witty (111) found that when children received instruction in the use of syllables there was much improvement in their spelling ability. Despite these facts, when Greene (46)), T. D. Horne (58), and Wolfe and Breed (112) presented spelling words to children in syllabicated form, there was little or no increase in achievement in spelling. However, Osburn (76) recommended emphasis on syllables in teaching spelling.

A few educators found that a knowledge of word derivation, or an understanding of prefixes, suffixes, and roots of words was associated with success in spelling. By studying spelling errors, Horn and Ashbaugh (57) and Barthelmess (83) discovered that children in elementary grades found inflected forms of words much more difficult to spell than the base words from which they were derived. In an experimental study, Otterman (77) increased knowledge of prefixes and roots of words in a seventh grade class and obtained definite increase in spelling achievement, especially among the poorer spellers. However, in a study involving fifth grade children, Jackson (63) stressed root relationships, similar endings, and sound groupings with no significant improvement in spelling ability. It should be pointed out that the parts of words emphasized may have been different; there is no indication that the "similar endings" and the "sound groupings" were meaning units as were the "prefixes" and "roots of words" emphasized in Otterman's experiment.

The evidence from the research indicated that a knowledge of syllables, prefixes, and roots of words was associated with achievement in spelling.

Several attempts were made to discover the value of rules and generalizations to success in spelling. In a critical examination of spelling errors made by students in grade eight, twelve, and university, Masters (70) found there was a need for the application of certain rules and generalizations. W. A. Cook (21) tested university students on their spelling ability and their knowledge of spelling rules. Although the freshmen obtained the higher scores on the test of rules they were less competent than the seniors in spelling. When Turner (101) and Burton (14) gave instruction in spelling rules to students from grade eight through university they found no significant increase in spelling achievement. However, Carrol (18), Archer (5, 6), King (66), and Gates (38) discovered that children in the elementary grades used generalizations. The use of rules enabled children to increase their efficiency in spelling, but wrong use of some generalizations often caused spelling errors. Gates (33) discovered that elementary children who learned to use generalizations were better able to spell new words, especially derivatives, than those children who had not received instruction. Archer (6) concluded that, in addition to teaching the rule, the method in which it was taught was important. He stated that it should be taught inductively. Results of the research indicated that the use of certain rules and generalizations affected, to some degree, achievement in spelling.

Spelling Achievement and Reading Abilities

Many educators believed that achievement in spelling was closely associated with the various reading abilities. In a study of disabled readers, Monroe (73) found that low scores in achievement in both silent and oral reading were accompanied by low scores in spelling achievement. In other studies, Rudisill (85), Templin (97), Perry and Morrison (80), Betts (9), Gates (34), Russell (89), Hartmann (52), and Weislogel (106), discovered similar relationships between reading achievement and spelling achievement. Results of experimental studies by Gilbert (38, 39, 43) and Tyler (102) revealed that students in high school and college improved their spelling ability through reading.

The relationships between reading vocabulary, reading comprehension, word recognition, word meaning and spelling achievement were studied. Peake (79), Spache (94), Merrill (72), and C. W. Harris (51) noted that children in the elementary grades and junior high school who scored high on tests of reading vocabulary were also competent in spelling. Similar results were revealed by Sister

Phelan (81), Hughes (62), E. A. Bond (11), Russell (88, 89), Townsend (100), Gates (36), Waldman and Triggs (104), and Crook (22) for the relationships between the various reading abilities and achievement in spelling. The research evidence seemed to indicate that reading vocabulary, comprehension, word recognition, and word meaning were determiners of achievement in spelling.

Spelling Achievement and Language Abilities

Some educators believed that certain language abilities determined success in spelling. Some studied the relationship between the knowledge of word meanings, or the ability to define words and to identify meanings of words, and achievement in spelling. Others studied the relationship between general verbal ability, or ability to express ideas in writing, and spelling achievement, while some studied the relationship between accurate pronunciation and spelling ability.

In studies of the relationship between achievement in spelling and knowledge of word meanings, Hollingsworth (55), Cobb (20), Gates (32, 34), Houser (59), Russell (88, 89), Williamson (108), and Murray (74) all found a close association. Reed (83) showed that giving attention to meanings of words while they were being studied was a distinct advantage to success in spelling. Experimental studies by Delacato (25) and Richmond (84) indicated that improvement in general verbal abilities increased ability to spell. Each investigator concluded that a knowledge of word meanings was closely associated with spelling ability. It must be pointed out that this knowledge of word meanings included ability to recognize the written word; in no study was a measure of the listening vocabulary used.

Several educators were of the opinion that the accuracy with which words were pronounced also affected spelling ability. Studies of spelling errors by Book and Harter (12) Gregory (47) and Carrell and Pendergast (17) indicated that mispronunciation was one of the causes of poor spelling. In studies of disabled spellers, Schonell (92), Hollingworth (55), Kiefer and Sangren (65) and Murray (74) listed defective pronunciation as one cause of the disability. Russell (86) found that the commonest types of speech errors were the same as the spelling errors. In testimonials received from college students, Coard (19) and Hildebrandt (54) observed that mispronunciation was considered an outstanding cause of poor spelling ability. In an experiment, Kay (64) found that correcting the pronunciation of certain words produced a noticeable gain in ability to spell. There seemed to be sufficient evidence to indicate that a general knowledge of word meanings along with ability to

pronounce words clearly and accurately was closely associated with achievement in spelling.

Although several investigations have been conducted in some areas but few in others, there is sufficient evidence to indicate that many factors, or abilities and skills, are related to achievement in spelling. This list includes the following: general intelligence, verbal and nonverbal intelligence, visual discrimination and perception, visual memory, auditory discrimination and perception, auditory memory; a knowledge of phonetic analysis, structural analysis, and word derivation; ability to use rules and generalizations; reading abilities including vocabulary, comprehension, and word recognition; knowledge of word meanings, and use of accurate pronunciation. Because of the number of skills and abilities listed, it is possible that some are more significant to spelling achievement than others. Some information related to this will be provided in another article at a later date.

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LEISURE READING IN ALBERTA

ROBERT R. FISK

*Donnan Junior High School
Edmonton, Alberta*

In the fall of 1958 The Library Sub-committee of the English Curriculum Committee arranged for a provincial survey to be made of the leisure reading programs in the junior and senior high schools. Questionnaires were distributed to 11,000 students and 2,000 teachers of leisure reading. The more significant findings and recommendations relating only to the junior high school grades (Grades 7, 8 and 9) are presented here.

The following leisure reading areas were investigated:

1. The library facilities and personnel at the service of school children. This included the types, sizes and scope of libraries and book collections, the supervision of libraries and the preparation of teachers for the presentation of the leisure reading program.
2. Current teaching procedures in leisure reading including the amount of school time provided, the emphasis, the checking and reporting methods and the motivational techniques.
3. The factors governing student choices of books as reported by both students and teachers.
4. The reading interests of students.
5. The quantity and quality of present leisure-time reading.
6. An evaluation of the present leisure reading program with special reference to the suggested book list *Reading for Pleasure*.
7. An evaluation of the present leisure reading course with reference to fundamental skills.
8. An evaluation of achievement in leisure reading in relation to the objectives set down by the Department of Education.
9. Suggested improvements to the present leisure reading program.

Results from both teacher and student questionnaires indicated that students were reading many books of good quality, with enjoyment.

Over 90% of the students said that reading was pleasurable. Teachers were more cautious, half of them estimating that 60% of their students enjoyed reading and one teacher in ten said that 90% of her students gained enjoyment from leisure reading.

Students were reading more than the suggested minimum of ten books per school year. The average number of books read by stu-

dents, according to their statements, was just over 16—15.7 for boys and 17.1 for girls—with 8.3 books for which credit was given and 8.1 books read without requesting credit. The peak year was Grade VIII with 17.9 books read. Rural school children read the most (18.3 books) and Roman Catholic Separate the least (13.8) books.

Teachers did not agree with the quantity claims of the students; 22% of the teachers said that half of their students were reading fewer than ten books per year; the mean was 6.3 books per student read for school credit.

Thirty-eight percent of the students stated that a lack of suitable books at school made it difficult to do sufficient reading. The leisure reading program could be improved, said 67% of all students, by more books of interest to them.

Students were given the opportunity of listing titles of books which they would recommend to friends. The majority of books listed were of satisfactory quality. Many books recognized as classics were listed. There were some titles of books of inferior quality and questionable subject matter listed, including *I'll Cry Tomorrow*, *Peyton Place*, and *Drop Them Colts*, but some of the most regularly listed were *Black Beauty*, *The Black Arrow*, *The Call of the Wild*, *Huckleberry Finn*, *Ivanhoe*, *Kidnapped*, *Treasure Island*, and *Tom Sawyer*, to mention a few. Forty-one percent of the students said that even if there were no leisure reading program they would still prefer books recognized as classics.

The fact that few unsuitable books were mentioned should be encouraging to teachers of leisure reading. Although it does not mean that children were not reading trash, it does indicate that students knew what sort of books were acceptable for listing on a school questionnaire; this is evidence that they had developed some taste in leisure reading.

There was some evidence to indicate that students were not reading widely. More than half of the teachers reported that about 50% of their students were obtaining variety in their reading experiences. Only 34 teachers of 800 reported excellent reading results as far as variety was concerned.

From the titles listed by students it was evident that students were not reading a sufficiently broad variety of books. It is suggested that our school book collections do not offer adequate variety. Children are reading *Nancy Drew* and *Sue Barton* and the *Hardy Boys* not just because they prefer these books but because our school library books lack heroines and heroes with which our students can identify themselves.

Teachers of leisure reading reported a shocking lack of suitable

books. For the majority of students the school was the principal source of reading material. Yet over one-half of the junior high schools had fewer than 200 books selected from *Reading for Pleasure*.

Teachers and students were aware of this lack; both listed it as the principal deterrent to reading. Students were reading interesting biography (their first choice of non-fiction) but listed no non-fiction in the categories "exploring new and strange lands", "accounts of war and conquest", and "occupations and careers", all of which rank high in their stated interests.

In fiction, "mystery and detective" was the favourite category among boys and girls at all grades and ages. Books are needed to bridge the gap from the *Hardy Boys* to *Sherlock Holmes*. Similar gaps were observed in "humour", "travel", and "stories of careers or personal achievement". Both variety and quantity are desperately needed in school book collections. Teachers said:

"It is impossible to carry on a very successful leisure reading program without books, books, books. If there are enough books of all kinds available, the competent teacher can get children to read even though the parents do not read."

"Books are in desperately short supply in this school. They are almost non-existent except those purchased by the students."

"More money is spent on bus transportation or athletics in one day than is spent for reading books in a year."

"Our schools lack central school libraries and librarians."

"Our classroom 'library' consists of only ten books."

"School authorities consider desks, blackboards and chalk as necessary equipment of a classroom, saws, planes and hammers as essential to Industrial Arts, but too often they overlook the need for books in developing a love for reading."

More than 90% of junior high school libraries were operated by classroom teachers or by student committees supervised by teachers. Twenty-eight teachers had had some library training; about one-half of the teachers of leisure reading had taken one or more English courses at University level.

Sixty percent of the teachers responsible for leisure reading had read, or were acquainted with, less than one-half of the books listed in *Reading for Pleasure*. This points to a real need in the Faculty of Education for a collection of *all* of the books recommended for reading by the Department of Education. It is suggested that such a collection be planned for in the library of the new Education Building. It has been suggested that this be named the "David Sullivan Collection" in memory of that eminent scholar-educator whose first love was literature.

Leisure reading was not being treated as a subject or as an important part of the English program: 153 classes of 800 were given less than 15 minutes per week for leisure reading and 308 classes were allotted less than one period each week.

Most teachers realized that efficient and pleasurable leisure reading demanded developmental and remedial teaching of the reading skills. Twelve percent of the students realized that lack of reading skill was acting as a deterrent to leisure reading. Nineteen percent of teachers claimed that more developmental and remedial reading would aid the leisure reading program. Forty-one percent of the teachers reporting indulged in an age-old prerogative of teachers; they declared that better developmental reading programs in the elementary schools would improve results in the junior high school leisure reading program. Fifty-five percent of the teachers were more realistic: they requested more help in diagnostic, remedial and developmental reading areas in order to assist them in improving their students' reading skills.

Teachers appeared to be uncomfortable about their qualifications for teaching leisure reading. About 50% of those reporting stated that teachers needed new and better teaching techniques in leisure reading. They felt that current teacher training programs were inadequate as far as preparation for the handling of leisure reading was concerned. They lacked knowledge of children's reading interests, of the books which they should be able to recommend to individual students and of the books which they recommended for purchase. They lacked knowledge of a range of motivation schemes with which to encourage reading.

The following were among the recommendations advanced:

Libraries

1. More books of interest to junior high school students should be provided for school libraries.
2. Leisure reading books should be obtained with due regard to variety, in order to fill gaps in both the fiction and non-fiction section of the school libraries.
3. More copies of certain books which are popular with students should be provided.
4. Central libraries should be established in every junior high school of over 100 students.
5. More use should be made of local libraries and travelling libraries.

6. A committee should be appointed by the Department of Education to study the junior high school libraries in Alberta. It is suggested that particular attention be given to the following items:
 - (a) the advisability of appointing a provincial supervisor of school libraries;
 - (b) the condition of the junior high school libraries with reference to physical facilities, bookstock, circulation, supervision and grants;
 - (c) the need for full time or part time teacher-librarians in the large junior high schools.
7. An annual report should be made to the Department of Education, through the superintendents, on the library facilities of each junior high school.
8. School libraries should contain magazines such as *Sports Illustrated*, *Field and Stream*, *Hot Rod*, *Mechanics Illustrated*, *Newsweek*, *Time* and *Macleans*, as well as *Boys' Life* and *Calling All Girls*.
9. A study should be made of student book clubs, such as the "Teenage Book Club", with special reference to the following:
 - the quality of the books offered for sale
 - their effects upon the reading habits and interests of the students
 - their value as steps on reading ladders.

Curriculum

1. Junior high school timetables should provide for one period of remedial or developmental reading and one period of leisure reading each week.
2. Plays and essays should be given more attention in the junior high school literature classes.

Teaching Procedures

1. A teacher's manual for leisure reading should be prepared by the Department of Education for the use of teachers of leisure reading. This might contain, among other items: teaching methods, motivation techniques, methods of checking and reporting leisure reading, gradings of books according to interest and difficulty levels, and criteria for book selection.
2. Reading is a highly individualized experience; the interests of the individual child should be respected and also widened, particularly in the direction of often neglected areas such as science, hobbies, careers, travel and humour.

3. Teachers should capitalize on current television and movie programs, particularly if these are based on significant literary works.
4. Teachers and librarians should have a much wider knowledge of books of interest to students.

Teacher Preparation

1. Additional courses in children's reading and library management should be provided by the Faculty of Education, University of Alberta.
2. Teachers-in-training should be given the opportunity of becoming acquainted with all of the books on the recommended leisure reading list—*Reading for Pleasure*.

PROLEGOMENA TO A SYSTEMATIC STUDY OF MOTIVATION IN EDUCATION: II MEDIATION VARIABLES AND HEBB

CHARLES C. ANDERSON
Faculty of Education

When we talk of mediation variables intervening between stimulus and response, we are caught up in the Law of Effect. Thorndike (1911), in his early formulation of this Law, stated that stimulus-response connections are strengthened if followed by 'satisfaction,' weakened if followed by 'discomfort,' but the nature of the satisfier eluded him and he had to resort to tautological equivalents such as 'an O.K. reaction.' Hull (1943) solved this problem by regarding pleasure or 'satisfaction' as need-reduction, need being taken to be behavior directed at restoring the homeostatic balance of materials and commodities such as air, water, food, temperature, and the intactness of bodily tissue, which are necessary for the survival of the organism. For Hull, positive reinforcers which stimulate eating, drinking and so on, facilitate learning ('habit-strength') because they reduce the need. Later Hull's (1952) concept was altered verbally to 'drive-reduction' and 'drive-stimulus reductions' but the fundamental meaning remained the same: that a reduction of unpleasant stimuli associated with 'homeostatic' drives was the fundamental reinforcing condition of learning. Any learning which did not appear to be a product of this primary reinforcement, for example classroom learning, was attributed to 'learned' or 'secondary' reinforcement, in which a neutral stimulus associated with the primary reinforcer acquired reinforcing properties in its own right. However, this later concept has never been completely accepted by psychologists themselves—Harlow (1955), Razran (1955)—and its application to education has never seriously been considered. A new approach to the Law of Effect by means of a scrutiny of the more important mediation variables of a psychological sort is in order.

Two subcortical systems of the greatest significance for motivation have recently been discovered: the limbic system and the reticular activating system (RAS). Olds (1955) (1956) has pointed out that the classical exploration of the cortex and the discovery of the sensory and motor systems was carried out fairly early, but that other areas of the brain, the hypothalamus, the limbic system or rhinencephalon or 'smell brain,' remained unexplored, partly because they were difficult to get at without damaging the brain and partly because there was no available means of measuring correlat-

ed psychological functions. The first problem was overcome by the development of a very fine needle electrode which could be inserted into any point in the brain without damaging it, and the second by the invention of the Skinner box which measured the rewarding effect of a stimulus in terms of the frequency with which an animal would perform an act which led to that reward. Olds set up a self-stimulation circuit such that, when the rat pressed a treadle in the Skinner box, it triggered an electrical stimulus to the brain. If that stimulus were rewarding, that is, if it hit a 'pleasure center' in the brain, the rat would repeat the performance consistently; if the area were painful, the rat would immediately desist; if the effect were neutral, an intermediate amount of treadle-pressing would be observed (eg. in the classical sensory and motor systems). As Olds (1956) remarks: "By putting the animal in the 'do-it-yourself situation (i.e., pressing a lever to stimulate its own brain) we could translate the animal's strength of 'desire' into response frequency, which can be measured" (1956, p. 4).

Why is the electric current so rewarding? There are at least two answers. Firstly, Olds points out that the strongest reward or pleasure responses were obtained from the stimulation of areas of the hypothalamus and certain mid-brain nucleic regions which Hess and others found to be centres for the control of digestive, sexual, excretory and similar processes. Indeed, in the rhinencephalon (or limbic system), the effects were milder. Olds, accordingly, believes that the stimulation is rewarding because it excites the nerve cells which would be excited by satisfaction of the basic drives—hunger, sex, thirst, elimination and so forth. However, there must be a pleasure drive over and above the mere satisfaction of needs. There are two sources of evidence for this statement: firstly, fully-fed rats will indulge freely in self-stimulation in this way (1955, p. 91), and, secondly, rats will endure a painful shock in pursuit of electrical stimulation of this sort, a shock which hungry rats will not endure in pursuit of food. Therefore, stimulation of these areas yields pleasure additional to the satisfaction of needs. What is it?

Olds provides overwhelming evidence that the main pleasure zone, the septal region, has as its two chief functions those of motor inhibition (*ibid.* p. 101, p. 106, p. 107, pp. 109-110, p. 110, p. 14) and, to a lesser extent, motor facilitation (*ibid.*, pp. 100-101). His theory of the conditions under which these opposite effects occur is similar to Berlyne's (1960) later and more sophisticated arousal theory. In effect, Old argues that the conditioned stimuli associated with rewards are "exciting" (this is Berlyne's 'orientation reactions' with arousal value) or facilitate motor response, while the rewards themselves have an inhibitory effect when they are actually stimulating

(Berlyne's arousal-reduction). From this we might hypothesise that pleasure is associated with the subject's awareness of negative feedback occurring, or of a cue that negative feedback is impending, manifested in the reduction of drives or drive stimuli—a very Hullian position. If this notion is correct, then we might expect experimental destruction of these areas to lead to agitated states and associated reactions of rage and restlessness (drive stimuli) and need-activity such as the hunger and search for food—which is what Magoun (1958, p. 60) reports.

So far so good. Pleasure is the absence of pain (or unpleasure) and must be present before learning can take place. Punishment, therefore, makes more pleasant, and better learned, behaviour which avoids it. But what homeostatic drive underlies learning? In particular, how can this system accommodate Harlow's (1954) demonstration of the existence of an exploratory drive and his contention that a great deal of learning goes on unrelated to homeostatic drives?

Motivational theory and research have in the past put undue emphasis upon the role of the homeostatic drives—hunger, thirst, sex and elimination—as forces energising and directing human behavior. There are, indeed, some psychological theorists who would have us believe that all or most of our adult human motives are either directly dependent upon these homeostatic drives, or are second—or third-order derived drives conditioned upon visceral needs. The fact that derived drives based on homeostatic needs are unstable and transient: the fact the conditioned drive does not apparently reinstate the unlearned drive state, and the fact that human beings learn and live for days, weeks, or months without or in spite of a particular homeostatic need state does not disturb such psychological theorists in the least. (1954, p. 37).

Can this exploratory or intellectual drive be reduced to physiological dimensions? Recent research by Lindsley (1957), Magoun (1958), Malmo (1959), and Berlyne (1960) suggests that the connecting link is the reticular activating system (RAS), arousal of which is a necessary prerequisite of all behavior. The RAS is a non-specific alarm system located in the brain stem, one of its main functions being to arouse the brain. Any sensory message from the body feeds into this system which, when stimulated, sends arousal signals to the cortex. Sensory input from the body also reaches the cortex via specific sensory pathways through the thalamus. The aroused cortex can then interpret these signals which it is receiving by the more direct route. RAS is clearly essential for the activation and termination of physiological need-states. As the body is depleted of the required chemical substance, the RAS is activated and produces an intensified vigilance together with exploratory behavior. This is the necessary condition for finding an incentive or goal-object and engaging in consummatory behavior which leads to tension-reduction (Dell, 1958, p. 377). Arousal-

increase, therefore, initiates the physiological drive, arousal-reduction terminates it. The same is true of cognitive activity because Olds (1959) reports that arousal-increase aids the cortex in focussing attention in perceptual discrimination and in sustaining intellectual curiosity, and arousal-reduction supervenes with a decline in that curiosity. Physiological and cortical drives may be similarly classified, therefore, as different methods of promoting arousal-reduction in response to different cue functions.

But Lindsley has pointed out that cortical activity can also stimulate RAS. What can we say of this? An answer to this problem has been provided by Hebb.

Hebb (1955) points out that, just as sensory input reaches the cortex in two ways, directly via specific sensory pathways and indirectly via the RAS, so

. . . in general terms, psychologically, we can now distinguish two quite different effects of a sensory event. One is the *cue function*, guiding behavior; the other, less obvious, is the arousal *vigilance function*. Without a foundation of arousal, the cue function cannot exist.

And now I propose to you that, whatever you wish to call it, arousal in this sense is synonymous with a general drive state, and the conception of drive therefore assumes anatomical and physiological identity. Let me remind you of what we discussed earlier: the drive is an energizer, but not a guide: an engine but not a steering gear. These are precisely the specifications of activity in the arousal system. Also, learning is dependent on drive, according to drive theory, and this too is applicable in general terms—no arousal, no learning; and efficient learning is possible only in the waking, alert, responsive animal, in which the level of arousal is high. (1955, p. 249)

Hebb immediately notices that the arousal aspect of his theory can explain curiosity and problem-solving without recourse to the Hullian conception of reinforcement provided we make one assumption and state one fact. The assumption, based on the work of Bexton, Heron, and Scott (1954), is that man has a general drive to maintain an optimum level of arousal. Hebb and Thompson (1954) report that "animals will always act so as to produce an optimal level of excitation." (1954, p. 552). The fact is the impact of cortical activity on the arousal system, which means, psychologically, the " . . . *immediate drive value of cognitive processes, without intermediary.*" (1955, p. 252). The assumption and the fact, taken in combination, explain the positive attraction of risk taking, mild fear, problem-solving and mild frustration.

When you stop to think of it, it is nothing short of extraordinary what trouble people will go to in order to get into more trouble at the bridge table, or on the golf course; and the fascination of the murder story, or thriller, and the newspaper accounts of real-life adventure or tragedy, is no less extraordinary. This state for excitement must not be forgotten when we are dealing with human motivation. It appears that, up to a certain point, threat and puzzle have positive motivating value, beyond that point negative value. (*ibid.*, p. 250)

If we concentrate exclusively on the general drive state involved in all motivations, then it becomes possible to adopt a single-drive theory of motivation:

The other single-mechanism theory of motivation which we may consider is that of the arousal system, the assumption that there is one drive state which differs only in the degree to which arousal occurs. This is the best unifying conception that is available to us at the present, but it too is probably unsatisfactory as it now stands.

This theory implies that anger and fear, for example, have the same common core of undirected, and undirecting, emotional excitation (i.e. arousal), and that the differences which obviously exist between these two states lie in the cue functions, not in the kind of arousal. In anger, for example, the stimulus excites the arousal system, and also excites S-R connections and meditational processes that result in attacking behavior. In fear, the stimulus excites the same drive state, but different cue functions which determine flight. (1958, p. 1959).

However, if we concentrate on the sources of this arousal, this general drive state, then the theory becomes a multi-drive one because some motivated behavior depends exclusively on cortical functioning.

The most plausible approach, perhaps, is to assume separate drives for the biologically primitive needs, each with its own pattern of activity in the brain-stem arousal system but still overlapping others, and to assume that other drive states originate in cortical processes and the 'down-flow' action of the cortex upon the brain-stem. (ibid. p. 160)

Hebb later reiterates this position and stresses the importance of this cognitive activity:

We have already seen that the nonspecific projection system of the brain stem, whose activity constitutes arousal, is excited by downstream paths from the cortex as well as by afferent paths. If we assume that arousal constitutes a general drive state (with or without qualitative variations as discussed in the earlier part of this chapter), we might expect to find cases in which arousal, and therefore drive, depend not on the presence of primitive need but on the complex cue functions of the cortex. Such cases in fact appear to make up an important part of the higher animal's motivations. Though they are not at all well understood it is essential not to overlook them. (ibid., p. 170-171).

In a final summary headed 'The goals of the higher animal,' Hebb divides men's goals into two: firstly there are the primitive biological needs involved in survival which, if not satisfied, become dominant. However, when these needs are satisfied, a second set appear: cortically-induced needs.

We find him looking for or inventing problems to solve, and mild risks to be run, apparently for their own sake. In man, with his high intellectual capacity, these tendencies produce complex and mechanical devils (eg. racing dinghies, bathyspheres, roulette wheels) and endless verbal elaborations of soluble and insoluble problems (eg., philosophy). The machinery of the nervous system, presumably enlarged under the influences of evolution as of value in seeking food and avoiding injury, has also developed certain intrinsic peculiarities which become very evident in an economically successful human society—a kind of Frankenstein's monster whose activities are not all undesirable. (p. 175)

Writing from the point of view of an animal psychologist, Hebb classifies motivations of this cognitive sort into two types: approach (exploratory activity) and avoidance, which is roused by the perceptual conflict between previous familiarity and learning and present sensory input (*ibid.*, p. 163). From the point of view of the educational psychologist, it would be better to say that perceptual and conceptual incongruity can stimulate arousal (1955, p. 252), although Hebb does not explain why this should be so.

Science is basically reductive, but what is the irreducible in psychological explanation? Hume once remarked that, beyond a certain stage of explanation you cannot go; you must stop asking questions. Is this true of Hebb's formulations? Is it quite reductive enough to say that we have "... a need to exercise the brain"? (*ibid.*, p. 173). And is it economical to postulate cortically-induced intellectual drives which differ from the other drives in that they have no tension-reduction function? For an answer to these questions and for the most plausible attempt to categorize intellectual curiosity with other tension-reduction drives we must turn to Berlyne (1960).

But what, someone may interpose, has all this to do with the classroom situation?

In 1930 Hebb was a teacher in an elementary school in Verdun. He carried out an experiment designed to find out whether a change in teaching method would improve discipline in the best sense, "... pleasure and willingness on the part of the child in working, honour, good conduct, and courtesy" (1926, p. 1). The school was in an industrial setting with the socio-economic status of the parents low, the drive for achievement in school negligible, indiscipline and impudence rife and amount of retardation considerable in the six grades. At the root of it all, according to Hebb was a "... vicious circle of strap, dislike of school, bad work, more strap and so on" (*ibid.* p. 1). The general aim of the new teaching method is described:

"In order, then, to get willing work from children who had never worked in school without force being applied, the staff took to heart the lesson of Tom Sawyer and his fence. To get that fence white-washed Tom discovered the easiest way would be to charge boys a price for the privilege of working at it. The moral, then, in school work, was to make work as pleasant as possible—and then speak of it always as a privilege, never to use it as a punishment, never to punish for not doing it.

Some of the detailed means are described in Hebb's later paper (1955):

"All of the 600-odd pupils ... ranging from six to fifteen years of age, were suddenly informed that they need do no work whatever unless they wanted to, that the punishment for being noisy and interrupting others' work was to be sent to the playground to play and that the reward for being good was to be allowed to do more work (1955, p. 246).

Hebb reports a significant improvement in discipline (by staff consensus), and in performance in all subjects previously detested—arithmetic drill, memory work, spelling and literature (by rough quantitative comparison). The effect in teachers can be imagined: freed from the strain of discipline, they found their professional tasks more pleasant.

In this early paper, Hebb makes no attempt to provide any psychological explanation of the pupils' changed attitude and motivation, but, in his later work (1955, p. 246), he explains the change in terms of his conceptual framework already described: bored with play, the children were motivated to work in order to raise the arousal level back to optimum—this is 'the immediate drive value of cognitive processes.'

This, then, is one of the educational implications of Hebb's work. Irrespective of whether we agree that the experimental findings do fit the theory, perhaps we might take the new method more to heart and put it into practice.

PART III: BERLYNE

Berlyne's basic hypothesis, validated by a considerable body of evidence, is that arousal-reduction is reinforcing (rewarding) and facilitates learning, the reduction being either of an immediate or of a delayed sort. Punishment of any type promotes arousal-increase, and any reward reinforcing learning logically implies the former, if we assume with Hebb and Berlyne an optimal level of arousal as a goal towards which the organism is striving. If we accept Berlyne's views it is psychologically unlikely that any learning can take place without the psycho-physiological basis of both punishment and reward being present. The cognitive drive of which Harlow made so much is simply one way of reducing arousal or, less frequently, of increasing it, and is therefore tied to the physiological tension-reduction model.

Berlyne then begins to establish his contention that arousal-increase underlies exploratory behaviour by showing that the variables formerly demonstrated as determinants of exploratory behaviour also activate arousal. He considers two main sorts of variables, affective (anxiety, especially under stress conditions, and emotional excitement), and collative variables (novelty, degree of change, suddenness of change, surprisingness, incongruity, complexity and uncertainty) and contends that these trigger off an arousal-increase associated with anxiety and an orientation reaction of vigilance which, in turn, sets off the exploratory behaviour for

arousal-reduction. Berlyne goes on to provide a neurophysiological basis for the effect these variables have on arousal.

We know that the activation of the RAS sends facilitating impulses down to motor units and activating impulses up to the cortex. It seems that the activation of the cortex causes it to send inhibitory impulses back to the RAS to counteract the influence of whatever has been acting on the RAS and to restore the original level of arousal. A sudden, intense activation catches the cortex off its guard, as it were, and causes equilibrium to be momentarily upset. If, however, the activation of the RAS is gradual, the cortex has time to adjust its inhibitory feedback and prevent the process from getting out of hand. (1960, p. 181).

Two conceptions are logically implied in Berlyne's model: firstly, there is a quest for intermediate optimum levels of potential, and secondly, pleasurable arousal-increases ('arousal jags') are sought occasionally. The former states that there is a general optimum arousal level for the individual, and that the organism strives to maintain an optimal influx of arousal potential. The latter states that the individual seeks out stimuli with high arousal value on two conditions: firstly, that the arousal is increased to a moderate extent, and, secondly, that the arousal is promptly followed by relief. In other words, a moderate degree of uncertainty makes life less dull. Boredom occurs when there is a rise in arousal with no means of arousal-reduction. In the case of the experiments on sensory deprivation, the specific explanation of the origin of the rise is that inhibitory impulses from the cortex, which normally dampen arousal, are inactivated as a result of the monotonous stimulation, an event which releases RAS from restraint and allows the level of arousal to go up. In the case of monotonous stimuli being too strong to be soporific (e.g. a clock ticking), boredom results because this stimulation acts on RAS to keep arousal high and, at the same time, incapacitates the cortex from inhibiting RAS (ibid. p. 191).

Admittedly this latter view is in contrast to Hebb's position that boredom is due to a decline in the optimum level of cortical activity, and the restlessness and rise in arousal is an attempt on the part of the individual to get the arousal back to its optimum level. However, Hebb's position is not completely validated in the Bexton, Heron, and Scott experiments. Their subjects' restlessness was reported to be unpleasant, which is very odd if it raised the level of arousal to an optimum level. Certainly the authors report that their subjects were 'eager for stimulation,' but was this a result of the individual's 'need to exercise the brain'? Most of the subjects seemed to be incapable of engaging in cortical activity of a directive sort: statements were made such as, 'I could not control my mind,' 'I could not get rid of images,' and the subjects seemed to have little control of the content of their hallucination.

Certain interesting points arise from Berlyne's model, all of them with educational implications. The first is the notion that the reinforcement at the basis of all learning is arousal-reduction. Berlyne demonstrates that this applies to Woodworth's 'sequent learning,' occurring when S_1 is followed by S_2 , and the subject learns to execute some response in preparation for S_2 during the interval between S_1 and S_2 , which covers both Pavlovian and operant conditioning. Why is this sequence, S_1 -R- S_2 , learned? Berlyne hypothesises that S_1 induces perceptual curiosity and an 'indefinite expectancy of something more to follow' with its associated arousal, which is reduced by the presence of S_2 . This arousal-reduction reinforces learning. Experimental extinction will set in immediately habituation to S_1 occurs. As evidence of this contention, Berlyne cites studies showing that the conditioned stimulus first evokes the physiological correlate of vigilance, cortical desynchronisation, which continues during the duration of that stimulus (*ibid.*, p. 222), and Gastaut (in Jasper, 1958) reports that the obverse of Berlyne's position is true, that active inhibition of conditioning can be obtained by stimulating the reticular formation—in other words, arousal-increase inhibits conditioning. It should also be noted that, if Berlyne's position is true, relatively disinhibited people like extroverts will condition significantly less easily than introverts, a point established by Eysenck (1959).

All problems arising from concepts such as 'secondary reinforcement' of the transient type, in which the association between the conditioned and the unconditioned response is temporary and an artificial product of the researchers' experimental design, can be explained in this way. For example, Miles (1956) discovered that rats were more resistant to experimental extinction of lever-pressing in a Skinner box if there were present during that extinction period secondary reinforcers (a light and the click of the food-delivery mechanism) which had been associated during the original learning with the primary reinforcers (food-pellets). He also demonstrated that successive spontaneous recoveries were due to the secondary reinforcer alone. These findings can be explained using Berlyne in the following way. Arousal comes from two sources: firstly, from the need-deprivation and, secondly, from the perceptual curiosity. When the light-click comes together with the food, there is a reduction of arousal from both sources and hence learning. In the case of the group which receives secondary reinforcement, there is reduction of arousal due to the curiosity alone and hence the response of lever-pressing is continued for some time (light learning), but this time is short because the response does not reduce the arousal associated with the primary need of de-

privation. Spontaneous recovery might also be explained in the same way.

The advantages which accrue from this position, well established by Berlyne, that all reinforcement is primary and takes the form of arousal-reduction (occasionally of arousal-increase in the form of an arousal-jag) are considerable. In the first place, it gets round the necessity felt by Hull of bridging the gap between physiological 'social' drives (e.g. social approval) by hypothesising that the stimuli triggering off the latter were originally associated with unconditioned stimuli triggering off the former. 'Social approval' for Berlyne, by contrast, would simply be interpreted as a label given to behaviour which is designed to reduce arousal in ways specified by previous learning and training; for example, a person may be trained to experience high arousal if people disapprove of him. In this way, the doubtfully valid strategy of tying socially oriented drives to physiological behaviour is avoided.

In the same way, Berlyne's model also resolves three controversies which have exercised writers basing their learning theory on conditioning. It represents a possible alternative solution to that of Hull and Osgood of the retroaction paradox, a puzzle which taxes the non-cognitive theorist and which involves the basis of their consequences? Hull's solution was that the 'stimulus' trace' perseverates until it is contiguous with the reinforcing state of affairs. On the present view, what perseverates is an unusually high level of arousal associated with the stimulus, reduction of which takes place as a consequence of the reinforcement.

Berlyne's model also resolves the controversy between Hull and Guthrie on the conditions of learning. Guthrie believes that a response gets conditioned merely because stimulus and response are contiguous; reward (reinforcement) merely prevents the unlearning of what was learned through contiguous association. Hull, on the other hand, argues that the contiguous occurrence of stimulus and response leads to conditioning *only* when followed by reinforcement. In fact, each is correct after a fashion. Underlying conditioning is reinforcement (Hull is correct), but the reinforcement is arousal-reduction and not the drive-stimulus reduction advocated by Hull, and arousal-reduction can take place without the reduction of a primary drive (Guthrie is right). This position is consonant with that taken up by Estes (1960), who found wanting the concept of associative learning as a direct function of the amount of reinforcement, and replaced it by a "... picture of unitary associations the learning and unlearning of which proceed on an essentially all-or-none basis" (1960, p. 220). However, *that* learning, for Berlyne, would be based on the reinforcement of arousal-reduction.

A third controversy, that over latent learning, can be handled very satisfactorily by Berlyne. Latent learning, which occurs when an animal is allowed to explore a maze without reward and in a satiated state, is reinforced by a reduction in the arousal associated with the orientation reaction of perceptual curiosity.

Berlyne's motivational model can also be applied to the higher sorts of learning. If we assume with Freud that one of the more important functions of the mental apparatus is the control of stimuli, that the escape of arousal stimulates anxiety, and that a sustained orientation reaction is at the base of cognition, then cognitive activity is motivated by the need for arousal-reduction. One particularly good stimulus to the sort of cognitive activity termed 'epistemic curiosity' by Berlyne is conceptual conflict; the central purpose of this behaviour for Berlyne is always the reduction of arousal, although the behavior is also often reinforced by extrinsic rewards when knowledge is sought for practical ends (*ibid.* pp. 278-280). This 'cognitive dissonance' or conceptual incongruity raises the level of arousal because the cortex, having no forewarning of the impending arousal potential, cannot forestall a disturbance of arousal equilibrium. Any psychological conflict or blocking sustains arousal and will therefore prevent learning during its course, except that which results in arousal reduction, a fact which would account for the significantly negative relationship consistently observed between level of anxiety and level of complex cognitive performance (Sarason, 1960).

Berlyne's position has been foreshadowed to some extent by Mowrer's earlier work (republished in 1950), in which he demonstrated that preparatory set or expectancy can function as a secondary drive. Mowrer found that he could not explain classroom learning either by referring to the satisfaction of organic needs or by using unanalysed concepts such as 'need for social approval,' and, in an attempt to attribute all learning to reinforcement and the law of effect, he postulates an underlying state of 'tension or discomfort' involving anticipation of the recurrence of physiological needs, including the need to avoid a noxious stimulus. This state is co-extensive with Berlyne's arousal and 'anticipation' is clearly Berlyne's orientation reaction. The similarity of the two systems can be further illustrated. Borrowing extensively from Freud's concept of 'signal anxiety,' Mowrer suggests that "... expectation and anxiety lie along a continuum with the former merging into the latter at the point at which it becomes uncomfortably intense, i.e. begins to take on motivational properties in its own right . . . " (1959, p. 18). In other words, anxiety is associated with significantly high arousal, or with the expectancy of that arousal. The deep

and intense expectation termed 'signal anxiety' motivates the individual to respond suitably to cues premonitory of the noxious stimulus (*ibid.*, p. 20). Using Berlyne's theory, we might speculate that the learning of the association between cues and the painful stimulus would take place because of the great arousal jag associated with the pain and arousal-relief or lowering of expectancy (*ibid.* p. 63) coming immediately afterwards. Future occurrence of the cues activates anxious expectation and a variety of acts, one of which will be selected and fixated because it most effectively reduces the arousal associated with the anxiety. Perception of cues leads the individual to take realistic avoidance precautions (*ibid.*, p. 21).

Mowrer's theory is a good deal more specific and overtly punitive than Berlyne's because he assumes that the discomfort associated with expectation will occur *only* when the individual anticipates deprivations in connection with organic needs, the main one for classroom purposes being the avoidance of noxious stimuli (*ibid.*, p. 29), whereas Berlyne takes the position that the arousal and its associated attitude of expectations may have determinants other than threat, e.g. cognitive incongruity, a point which extends the range of its application to the classroom situation. However, both theorists accept the view that motivation involves a state which may be labelled as 'tension,' 'discomfort,' 'emotional arousal,' 'arousal,' and that learning is impossible without this primary state of arousal-imbalance, which mainly takes the form of a significant arousal-increase for Berlyne but which might hypothetically also take the form of a significant arousal-decrease below optimal level, with subsequent arousal-equilibrium. Punishment or conceptual incongruity and all motivating stimuli are simply ways of increasing this imbalance to make the subsequent need-reduction more effective as a reinforcing state of affairs.

The teacher, therefore, in order to ensure that the child learns has to arrange matters so that the cycle of arousal in the child follows a homeostatic pattern of arousal-increase followed by arousal-decrease to the optimum level. This can often be done by presenting arousal cues in the shape of a scowl, a movement or series of words which will arouse anxious expectation and a search for the correct and suitable behaviour and response. The cue for punishment should be switched off as soon as the correct behaviour is elicited so that this anxious expectation will be followed immediately by arousal relief. Mowrer points out that such motivating strategy cannot be applied to dull and neurotic children (*ibid.*, p. 63). Another way to propel the child along the road of learning is to present conceptually difficult or incongruous problems, but the

efficiency of such a strategy depends on the aligning of the problem to the child's capacities.

Berlyne's model can integrate and thereby make more meaningful some persistent topics in educational psychology. 'Transfer of training' is a transfer of codes or invariants which are learned because they diminish the arousal associated with novelty and conceptual conflict. 'Level of aspiration' findings can be explained as a product of level of achievement interacting with level of arousal. Thus the normal or usual level of aspiration for the successful child is slightly above his level of past achievement, which is the academic correlate of the 'arousal jag'—the goal aspired to implies a certain amount of anxiety associated with a new effort, but, on the basis of past efforts, success is fairly well assured. The unrealistically high or unrealistically low levels of aspiration of the failure are methods directed at reducing arousal.

McClelland's (1955) (1958) achievement or achievement motivation can be explained quite simply as a product of child-rearing practices in which children are trained to believe that one of the main ways to reduce the arousal associated with parental disapproval is to do well in school. And what of the child who actually seeks out new problems to solve? Each previous cognitive success in the form of a solution of conceptual conflict is attended by primary reinforcement in the shape of arousal-reduction. The cumulative effect of pleasurable cognitive activity leads to the formation of a habit with compensatory properties. On the other hand, the unsuccessful child is understandably averse to becoming involved in an activity which raises, without reducing, arousal.

Aspects of Berlyne's model are congruent with and incorporate the concepts of other theorists. The concept of anxiety generated from his system fits that of Freud. For Berlyne, anxiety is a sudden escape of arousal from corticoreticular control, and this resembles Freud's conception of the primary function of the central nervous system as the mastering of stimuli:

'... the nervous system is an apparatus having the function of abolishing stimuli which reach it, or of reducing excitation to the lowest possible level ... let us grant that the task of the central nervous system is ... to master stimuli (1959, p. 63, originally 1915)

Harlow's (1958) approach to learning can be profitably elucidated by reading of Berlyne. According to Harlow,

"Learning, all learning which has been adequately described and measured, appears to be the learned inhibition of responses and response tendencies which block the animal or fail to lead to some terminal response ... " (1958, p. 285).

This can be explained by applying Berlyne's notion that not getting the right response will keep arousal high and impede learning;

getting the right response will facilitate arousal-reduction and hence learning. And what about the inhibition itself? This looks very like Berlyne's corticoreticular control of arousal, a speculation which would link Berlyne and Thurstone (1924).

Any hedonistic position can be incorporated into Berlyne's theory, with the exception of Young's (1959) and Pfaffmann's (1960), which it cannot handle. For example, Troland's (1928) 'prospective hedonism' postulates that a man will be motivated to act if he considers that the outcome of his action will be more agreeable or less disagreeable than his present state. This becomes, in Berlyne's terms 'that a man will be motivated to act if he estimates that there is a high probability that certain cues will lead to an 'arousal jag' or 'arousal-reduction'. The rephrasing also fits exactly McClelland's (1951) (1955) general theory of the formation of motives, in which the assertion is made that organisms strive for pleasure and to avoid pain associated, respectively with small or large discrepancies from what he terms 'adaptation level,' which is Berlyne's intermediate arousal level, although McClelland conceives of a large number of different adaptation levels for different stimulus properties, whereas both Hebb and Berlyne conceive of only one optimum arousal level for a person to which many stimulus properties will contribute.

Theories of motivation based on arousal and cue functions (for example, the ethologists' IRMs and 'releasers,' 'Freudians' id and ego or primary and secondary processes) can be incorporated into Berlyne's system, as can the need-drive-incentive positions (Stone, 1951) and 'cognitive concepts' such as Festinger's (1958) 'cognitive dissonance', Abelson's (1959) 'cognitive imbalance' and Secord and Backman's (1961) 'striving to achieve congruency,' the latter being simply different versions of Berlyne's 'conceptual incongruity' which motivates the individual to reduce the arousal after some fashion or other. 'Values' as motivational stimuli are verbal habits which, as a result of their use in past training, motivate the individual to behave in ways that guarantee either arousal-reduction or an arousal-jag, and the power of advertising to motivate people to buy can be ascribed to its property of stimulating arousal and promising arousal-reduction when the product has been bought.

This, then, is the most plausible contemporary psychological synthesis with clear educational implications. Whatever motivates a student must provoke arousal-imbalance or the threat of arousal-imbalance and must provide arousal-relief or the promise of arousal-relief. These motivating stimuli sometimes take the form of the teacher's behaviour and attitude, and sometimes of perceptual and conceptual incongruity associated with the external environment,

and the cognitive activity, exploratory behaviour and learning which take place are designed to reduce that arousal.

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THE INFLUENCE OF HOMOGENEOUS GROUPING ON TEACHER MARKS IN THE HIGH SCHOOL

by

T. J. SAWCHUK

*Assistant Principal
Ross Sheppard High School
Edmonton, Alberta*

D. B. BLACK

*Faculty of Education
University of Alberta
Edmonton, Alberta*

Statement of the Problem

Among school administrators interest has been mounting with respect to grouping pupils on the basis of ability and achievement. The impact of this trend first affected the elementary schools where grouping has been used for reading and other instruction. This trend has not, as yet, made much impact upon administrative planning in many high schools. Grouping in high school is made on various bases, the most common of which are previous achievement and the program selected by the pupil. The subject of this paper is one of the controversial issues which has developed from the concern of teachers and heads of departments about the final grades received by pupils classified into homogeneous groups. Such classification, with all its administrative problems, must prove of value to the pupils and the school or the effort is not worthwhile. The validity of grades is one of the criteria of assessing the value of any school organization. Teacher influence is obvious on final results in high school courses where common examinations are not held. Those teachers who have not accepted the concept of classes composed of pupils with very similar ability, may still attempt to classify pupils within each class as superior, average and below-average, thereby losing the perspective of the entire program. Pupils falling in the below-average category in a superior class should possibly receive lower marks than if they had been in a heterogeneous class. Conversely, a pupil whose results place him in the upper level of a below-average homogeneous group could possibly receive higher marks than if he had been placed in a heterogeneous class. Teachers who make such errors in grading practices apparently equate the enriched program of the high ability classes with the meagre core curriculum of the low ability classes.

Job placement after graduation, or the necessity of reliable grading for those who transfer to other schools or enter institutions of higher learning, demands valid grading procedures. School marks which are affected by a pupil's level in a given group and possible teacher bias may adversely affect his future. The ramifications of grading procedures for the present and future welfare of all pupils suggest a need for an analytical comparison of the final results received by pupils grouped homogeneously or heterogeneously, to ascertain if a real problem of pupil evaluation exists.

This paper reports the findings of a study aiming to evaluate the effect of homogeneous grouping on teacher marks by comparing pupil grades in a school where students are grouped in homogeneous classes with those of pupils of equal ability in a school where pupils are grouped heterogeneously.

Experimental Design

This study attempts to compare the final Grade X results of students grouped homogeneously in classes according to their achievement on the Province of Alberta Grade IX Department of Education examinations with the Grade X results achieved by students who were not so grouped. However, problems of comparing the initial ability of the students entering the two high schools would have to be met before any attempt could be made at a comparison of the final ratings received in Grade X.

The experimental design chosen was such that performances of students of like ability were compared on a class-to-class basis. This meant that the pupils from School R, where they were not grouped homogeneously, would, for purposes of comparison only, be artificially grouped into classes on the basis of homogeneous achievement using the same common Grade IX examination results. These classes would then parallel those of School S where the students had been initially grouped on the basis of homogeneous grade IX test achievement. The purpose of this artificial grouping was to provide comparison groups of equivalent initial ability.

Sample

Two Edmonton public high schools were chosen for this study. School S classified its Grade X pupils homogeneously on the basis of achievement on the Province-wide Grade IX Department of Education examinations administered in June of the previous year. The other school, School R, assigned them randomly. In all, 248 Grade X students from School S and 197 Grade X students from School R were used in this study. All students met the following qualifications: (1) they were enrolled in the Grade X matriculation program in the 1957-58 school year; (2) they had written the Province-

wide Grade IX Department of Education examinations in June 1957; (3) during the previous year each had been enrolled in a junior high school operated by the Edmonton Public School Board.

Study Variables

The data were taken from the cumulative records of the students used in this study. Additional information came from the administrative records of the high school concerned.

Eight Grade IX variables were used in this study. These were the stanine records received by each pupil on the Grade IX Department of Education examinations in Reading, Social Studies, Language, Mathematics, Science and Literature, the aggregate stanine scores and the Total score on the School and College Ability Test, Level 3 (SCAT 3). The latter was reported as a percentile score.

The Grade X variables consisted of the marks received in the following Grade X subjects: the common core of Language 10, Literature 10, Social Studies 10, Mathematics 10, Science 10, Physical Education 10, Health and Personal Development 10 (H. & P.D. 10), and electives. It is noted that all students took the common core of subjects listed above. Because of the wide variety of electives available to these students, it was deemed advisable for purposes of this study to average the scores obtained in these electives into a single Grade X variable. This has been simply identified as Electives.

Criteria Used For Artificial Grouping Of Students From Heterogeneous Ability Classes Into Classes Parallel To Those Composed Of Homogeneous Ability Students

Pupils taking the matriculation program in School S had been grouped into nine Grade X classes on the basis of achievement on the Grade IX Department of Education examinations. Placement was based on the aggregate stanine score received by each pupil. In establishing artificial classes of students of homogeneous ability from School R, to match the classes in School S, the following steps were taken: (1) each class was kept approximately proportional in number to the corresponding class in School S based on the ratio of pupils in each school (197 from School R, 248 from School S); (2) the ratio of boys and girls in each class was made to conform as closely as possible to the ratio in the parallel class in School S; (3) the mean stanine score in each class was made as nearly equal as possible to the matching class in School S. These data are summarized in Table I. It must be emphasized that although students in School R were grouped artificially for the purposes of this study, these students were not grouped within the school itself during the academic year for instructional purposes.

TABLE I
COMPARISON OF GRADE X CLASSES IN SCHOOL S WITH
MATCHING "ARTIFICIAL" CLASSES IN SCHOOL R

Class No.	School S				School R			
	N.	Boys	Girls	Mean Aggregate Stanine	N.	Boys	Girls	Mean Aggregate Stanine
1.	35	19	16	50.20	19	13	6	50.11
2.	33	17	16	46.06	26	11	15	45.65
3.	31	19	12	39.77	25	15	10	39.92
4.	28	.....	28	39.07	23	12	11	39.30
5.	30	21	9	35.70	25	18	7	35.44
6.	29	19	10	33.14	24	17	7	33.33
7.	18	9	9	31.56	17	9	8	31.06
8.	28	19	9	29.57	25	18	7	29.44
9.	16	9	7	25.38	13	7	6	26.08
Total	248	132	116	38.41	197	120	77	37.65

Each pair of matched classes was called a "group", thus creating nine groups. A "group" means, therefore, a specific pair of classes, while "class" refers only to a class in the specific school.

Two deviations from the criteria used for dividing the students from School R into "artificial" classes were found necessary in Classes 1 and 4. Class 1, the top-ranked class, was smaller than the number required to maintain the correct proportion. There were not enough high-achievement pupils entering School R to complete a class of twenty-eight pupils and still retain a sufficiently high mean standing of aggregate stanine score comparable to Class 1 from School S.

Class 4 from School S was composed entirely of girls. Because there were proportionately fewer girls in School R, the creation of an all-girl artificial class would have further distorted the ratio of boys and girls in the other classes. Therefore, eleven girls and twelve boys were assigned to this "artificial" class in spite of the parallel class being composed entirely of girls.

Basic Assumptions

The following assumptions were made in the study:

- (1) Grouping pupils of homogeneous ability provides an opportunity for better teaching. It should be noted here, however, that it is not the purpose of this study to prove any superiority for homogeneous grouping. This assumption is based on the results established in the research literature. (See bibliography.)
- (2) Teachers in both schools were comparable in ability and qualifications.
- (3) It cannot be assumed that the curriculum in each course is the same in each school other than being within the limits of the Provincial Course of Studies. If the advantages of homogeneous grouping are to be achieved, and it was an assumption of this study that they were, the curriculum of each class consisting of homogeneously grouped pupils would differ. The low-ranked classes would receive only the core of each course while the top-ranked classes would receive an enriched curriculum.

Hypothesis

Mitchell feels that grouping "is a powerful device for easier teaching and for better learning" (14, p. 22), and that this should result in higher final grades. The hypothesis of the study was that homogeneously grouped students will get higher marks than students of comparable ability who are not so grouped. However, there is some doubt whether all pupils benefit equally. A sub-hypothesis of this study was that the lower-ranked pupils within homogeneous classes of high ability will receive lower final marks than they would if they had been placed in classes of heterogeneous ability. Similarly, teacher rating of top-ranked pupils in homogeneous classes of low ability would be higher than if the same pupils had been placed in classes of heterogeneous ability.

Analysis of Data

The testing of the hypothesis involved two major issues:

- (1) Were the pupils in both schools comparable in initial ability as judged by their performance on the Grade IX Department of Education examinations?
- (2) How did the final Grade X marks compare between schools, and between specific groups in the schools?

I. Comparison of the Initial Ability of Students in Both Schools

(a) *Total Group*

The hypothesis tested here assumed there was no significant difference between the initial ability of pupils entering the two schools.

This hypothesis was tested by comparing the performance of each group of pupils on each of the Grade IX Department of Education examinations.

The analysis of data confirming the above hypothesis is presented in Table II. No significant differences were found between the mean performances of each school's students on the eight Grade variables examined.

Significant differences in variability of marks between the two groups were found at the five percent level of confidence in Grade IX Language and Science. In either case, the actual difference in variability was less than a quarter of a stanine. This was not considered of significant magnitude to refute acceptance of the hypothesis. Therefore, it was concluded for purposes of this study, that there were no differences in the initial ability of students entering the two high schools.

(b) Comparison of Paired Classes

This analysis represented a further extension of the hypothesis stated above in section (a). The hypothesis tested here is that there were no significant differences in mean performance between pairs of matched classes for each of the eight grade IX variables used to evaluate the initial ability of the students.

Although the data are not presented, significant mean differences were found only in Group 8 which was a low ability group. Significant differences at the one percent level of confidence were found in Reading and Literature favoring School S's Group 8, and in Mathematics favoring School R's Group 8. No other significant differences were found.

Therefore, it was concluded, that for the purpose of the study, the hypothesis stated above was accepted. There were no significant differences in initial ability between each pair of classes of the nine groups. In Group 8, three (of a possible eight) significant differences were found. The contradictory direction of these differences indicated no reason to reject the hypothesis.

II. Comparability of Final Grade X Scores

(a) Comparison of Total Performance in Each School

Homogeneous grouping is reputed to afford the teacher a better opportunity to teach such classes because of the narrower range of ability in each class. Improved instruction should mean greater academic gains which, in turn, should be reflected in higher marks. Therefore, the hypothesis tested in this section is that students from a school where pupils are grouped in homogeneous classes (School

TABLE II
COMPARISON OF TOTAL GRADE IX ACHIEVEMENT OF
PUPILS ENTERING THE GRADE X MATRICULATION
PROGRAM AT SCHOOL S AND SCHOOL R IN THE
FALL OF 1957

Grade IX Variable	School S			School R			Mean Difference	Analysis of Variance
	N.	Mean	S.D.	N.	Mean	S.D.	"t" test	"F" test
1. Reading (a)	248	6.6331	1.5908	197	6.3604	1.595	1.7905 N.S.D.	1.0058 N.S.D.
2. Social Studies (a)	248	6.4919	1.5579	197	6.3100	1.5709	1.2184 N.S.D.	1.0166 N.S.D.
3. Language (a)	248	6.2782	1.5629	197	6.0863	1.3396	1.3956 N.S.D.	1.3612 5% (S) (d)
4. Mathematics (a)	248	6.2782	1.6082	197	6.3096	1.5349	.1582 N.S.D.	1.0978 N.S.D.
5. Science (a)	248	6.3871	1.6590	197	6.4518	1.4084	.4444 N.S.D.	1.3880 5% (R) (d)
6. Literature (a)	248	6.3427	1.7155	197	6.1320	1.6838	1.2990 N.S.D.	1.0379 N.S.D.
7. S.C.A.T. (b)	248	68.532	20.020	197	67.013	20.855	.7762 N.S.D.	1.0855 N.S.D.
8. Stanine Aggregate (c)	248	38.41	7.8030	197	37.65	7.6175	1.1959 N.S.D.	1.0486 N.S.D.

(a) Results in these variable are reported in stanines.
(b) S.C.A.T. are reported as percentile rank.
(c) Stanine Aggregate is reported as the sum of variables 1 to 6.
(d) School with larger standard deviations.

S) should have higher marks reported for the total group than a school where there is no homogeneous grouping of students (School R).

The summary of the analysis of the data to test this hypothesis is presented in Table III.

TABLE III
COMPARISON OF TOTAL GRADE X ACHIEVEMENT OF
MATRICULATION PUPILS IN SCHOOL S (N = 248)
AND SCHOOL R (N = 197)

Grade X Variable	School S		School R		Significance of Differences	
	Mean	S.D.	Mean	S.D.	Means	Variance
Language 10	63.125	11.1490	62.280	10.3240	NSD	NSD
Social Studies 10	63.970	12.8675	61.420	12.3740	NSD	NSD
Mathematics 10	57.580	14.3540	58.425	15.6115	NSD	NSD
Science 10	66.370	11.5875	59.340	14.515	1%(S)	1%(R)
Literature 10	64.435	10.1610	63.400	12.265	NSD	1%(R)
Physical Education 10 ...	60.705	6.750	68.425	8.960	1%(R)	1%(R)
H. & P.D. 10	64.645	9.070	62.760	10.1565	NSD	1%(R)
Electives	64.270	11.525	62.030	10.5250	NSD	NSD

Significant differences in mean final grades were reported for only two courses, Science 10 and Physical Education 10. In both courses, the differences were significant at the one percent level of confidence. One of these significant differences, Physical Education 10, favored School R where pupils were not grouped homogeneously. The other, Science 10, favored School S where pupils were grouped homogeneously.

It is concluded that with the exception of Science 10, the hypothesis is rejected. Students grouped homogeneously in one school do not receive significantly higher marks than do students from the school which does not group pupils on this basis.

In light of the above hypothesis, the significant difference of marks received in the two schools in Science 10 and Physical Education 10 leads in each case to two possible explanations. First, Science 10 is being taught more effectively to students who are grouped homogeneously and this is recognized when marks

are assigned, while Physical Education 10 is better taught to students who are not grouped according to academic ability. Second, the marking policy of the departments concerned in the two schools is basically different. Of the two possibilities, the difference between the Science 10 marks could best be explained on the basis of the influence of ability grouping. However, in Physical Education academic ability is known to bear little relationship to physical skills. Therefore, the most reasonable explanation would seem to be that the teachers of Physical Education 10 in School R rate their pupils on a different weighting of criteria than do the teachers at School S.

(b) Comparison of Final Marks in Each Group

This section is a further expansion of the hypothesis tested in the section above. The hypothesis remains essentially the same as before, namely, that students grouped homogeneously will get higher marks than comparable students who are not grouped according to ability.

Table IV presents the summary of the tests of significant differences between class means for each of the eight Grade X variables and for each of the nine pairs of matched classes. It seemed reasonable from the findings of this analysis to conclude that the hypothesis that pupils enrolled in homogeneous classes will receive higher marks could be rejected in all subjects except Science 10.

Because of their initial homogeneous placement, pupils in School S should show the benefits of improved instruction accruing from such class organization. This should be particularly evident for students of high and low ability although the trend could also be expected in the middle ability groups. This hypothesis was examined by dividing the nine pairs of classes into three main groups. These were considered as above-average, average and below-average groups.

Analysis of Table IV indicates that pairs of classes in groups 1, 2 and 3 (the above-average group) at School S performed at a significantly higher level in three instances, and were significantly lower in four others. In the average groups, consisting of classes 4, 5 and 6, there were three cases of significantly superior achievement and five cases of significantly lower achievement reported for the students from School S. Similar results were apparent between the paired classes of groups 7, 8 and 9 composing the below-average group. For this group there were four significant incidents of superior achievement by School S classes and seven of significantly lower achievement. Although generally inconclusive, these results further discount the hypothesis that superior marks will be received by homogeneously grouped pupils.

TABLE IV
SUMMARY OF THE SIGNIFICANT DIFFERENCES OF CLASS
MEANS OF MARKS RECEIVED BY GRADE X PUPILS IN
BOTH SCHOOLS

Class Grade X Variables	High Initial Ability			Group Average Initial Ability			Low Initial Ability			Total
	1	2	3	4	5	6	7	8	9	
Language 10	NSD	NSD	NSD	NSD	1%(R)	NSD	NSD	NSD	NSD	NSD
Social Studies 10 ..	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD
Mathematics 10	5%(R)	NSD	NSD	1%(R)	NSD	NSD	1%(R)	NSD	5%(R)	NSD
Science 10	NSD	5%(S)	1%(S)	NSD	1%(S)	1%(S)	1%(S)	1%(S)	5%(S)	1%(S)
Literature 10	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD
Physical Ed. 10	1%(R)	5%(R)	1%(R)	5%(R)	1%(R)	1%(R)	1%(R)	1%(R)	1%(R)	1%(R)
H.P.D. 10	NSD	NSD	NSD	NSD	NSD	NSD	NSD	NSD	5%(R)	NSD
Electives	NSD	NSD	NSD	NSD	NSD	5%(S)	1%(S)	NSD	5%(R)	NSD

The above hypothesis was tested further by use of the Sign Test (11, p. 68). It was reasoned that if the hypothesis were true, mean marks from School S should be consistently higher for each of the nine classes, even though the differences between the paired classes of each group might not be statistically significant. A plus sign (+) was assigned to a class from School S which achieved a higher mean in any Grade X variable than the parallel class from School R. A minus sign (—) was given when the School R class had the higher mean. In a case where the means were equal the tie was distinguished with a zero (○). This analysis is presented in Table V.

The hypothesis that pupils grouped homogeneously in School S will receive higher marks than pupils of equal ability in School R is accepted only in Social Studies 10 at the five percent level and in Science 10 at the one percent level of confidence. On the contrary, the final marks assigned to students of Physical Education 10 and Health and Personal Development 10 at School R were consistently higher than those assigned at School S. The mean mark in Physical Education 10 was higher in School R at the one percent level of significance, while Personal Development grades were consistently higher at the five percent level of confidence.

(c) *Comparison of Variability of Marks in Each Group*

Another indication of the effectiveness of instruction is found in the range of marks earned. If the instruction is more effective, variability of marks within the class will increase. This is particularly evident in studies involving classes initially matched for ability and then taught by different methods of instruction. For this study then, a test of the improvement in instruction because of homogeneous grouping may be indicated by differences of variability between the paired classes.

The hypothesis to be tested in this section is that the marks of the students grouped homogeneously in School S will display greater variability than those students of like ability from School R where there is no attempt made to group pupils on this basis.

Repeating the same method of analysis used in the section above, i.e.: testing for differences in variance for significant differences and using the Sign Test, the following conclusions were reached. First, while class means in Social Studies 10 and Science 10 favored School S, variability of marks in these subjects was greater in the classes from School R. This means that pupils from School S received more homogeneous marks within each class than did the pupils from School R. This was evident in all classes including those from School S which had higher class means. Because class means and variability of marks were not consistently higher in

TABLE V
SIGN TEST COMPARISON OF MEANS OF MATCHED
CLASSES

Grade X Variable	High Initial Ability					Average Initial Ability					Low Initial Ability					Favoring School S		Favoring School R	
	1	2	3	4	5	6	7	8	9	Ratio	P.	Ratio	P.	Ratio	P.	Ratio	P.	Ratio	P.
Language 10	+	-	+	-	-	-	+	-	+	4/9	.50	5/9	.746						
Social Studies 10	+	+	+	+	+	+	+	+	-	8/9	.998*	1/9	.02						
Mathematics 10	-	0	0	-	+	+	+	-	-	3/7	.500	4/7	.793						
Science 10	+	+	+	+	+	+	+	+	+	9/9	1.000	0/9	.002						
Literature 10	+	-	-	-	-	-	+	+	+	4/9	.500	5/9	.746						
Physical Education 10	-	-	-	-	-	-	-	-	-	0/9	.002	9/9	1.000**						
H. & P.D. 10	-	-	+	-	-	-	-	-	-	1/9	.02	8/9	.998*						
Electives	-	+	-	+	-	+	+	-	-	4/9	.500	5/9	.746						

*Significant at 5% level.
**Significant at 1% level.

favor of the homogeneously grouped pupils in School S, this suggests that the pupils did not receive superior instruction or that teachers did not recognize superior performance from some pupils with higher grades. Higher grades received by these pupils would have increased both the class means and variability of marks. Therefore, the above hypothesis is rejected because teachers tend to give more homogeneous marks to homogeneously grouped pupils in this study.

Further analysis of the greater variability of marks by pupils who had been grouped heterogeneously suggested the strong possibility that some pupils are allowed to perform at a lower level of achievement than could be expected from pupils of their ability. On the contrary, those pupils who had been grouped homogeneously appeared to achieve results more commensurate with class ability, therefore resulting in more homogeneous marks. This could be a strong endorsement for classifying pupils homogeneously, in order that more pupils may be motivated to achieve school grades which are commensurate with their ability.

Conclusions

This study assumed that homogeneous grouping of students is desirable inasmuch as this administrative arrangement of students will afford better instructional and learning opportunities in the classroom. Therefore, students in such schools should perform better than students of equivalent ability not so grouped. This study sought to test this hypothesis. With one, and possibly two exceptions this hypothesis was rejected.

Consider then, the dilemma of someone reading the transcript of two students from each of the two schools used in this study and for whom the same grades were reported. One student had all the institutional advantages of grouping procedures and competition and cooperation with his academic peers while the other had none of these. The reader not knowing that one set of marks was from a streamed program would find little to choose between each, all other things being equal. The findings of this study would suggest two possible explanations: first teachers do not recognize the possibilities of homogeneous grouping and are not demanding and/or recognizing the relatively superior performance of these students; or second, the evaluation policies of the homogeneously grouping school are such as to deny their students the recognition of the superior quality of instruction and the performance of the students.

The findings of this study would suggest that with the advent of streamed programs, grading practices, now more than ever, should receive the full attention of administrators and teachers. School

administrators whose pupils are grouped homogeneously, may find it necessary to devote increasing amounts of time towards helping teachers develop an awareness of the needs of classes of varying ability. Teachers will need assistance in assessing more accurately individual students and total class achievement. At the same time, a continuous analysis of grading procedures should be maintained within each class and within the entire school to ensure the assignment of valid grades. If some schools continue to group heterogeneously while others group homogeneously, further complications would become apparent. Assuming that instruction to classes of homogeneous ability is superior, and if the marks received by the pupils do not reflect this fact, then a double standard of marks will inevitably follow. This would be a partial solution to the problem of interpreting transcripts but it will also serve to add confusion by proliferating the number of standards used to assess student performance data. Some external assessment medium would then have to be employed to validly assess achievement on a comparable basis. This latter solution is not without its limitations, particularly if discretion is not used in the application of external assessments. This could well limit or even eliminate the advantages of present school accreditation practices. The solution to these problems is worthy of further experimental examination than was possible in this study.

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BOOK REVIEW

THE COIL OF LIFE. By Ruth Moore. New York — Alfred A. Knopf, 1961, pp xvi + 418, \$6.50.

The title and jacket design of this book indicate that its subject is the biological significance of the nucleic acids. In actual fact, the greater portion of the book does not deal with nucleic acids directly, but is a history of the main developments in biology over the last two hundred years.

While the historical approach to present knowledge may be a wise one, the book suffers from an over-emphasis on earlier discoveries. It begins with 240 pages of detailed description of "Lavoisier's proving, through his discovery that breathing is a combustion, that the body is governed by physical laws; upon Wohler's showing that the secretions of the body were not mystical substances, but compounds makable by man; upon Bichat's finding of the tissues; upon Pasteur's proof that life is not created spontaneously; upon Fischer's demonstrating that proteins are chains of matter; upon Roux's and Driesch's opening glimpse into the miracle of development; . . ." and of many more of the early scientists and their work. The method of presentation of this historical material can only be described as laborious and unimaginative. The author *describes* to us the characteristics of the scientists and the conditions under which they work, but the men themselves do not emerge. Somehow one is left with the picture of dedicated and faceless men, rising, each in his own generation, to work his allotted time and pass on, nameless, helpless tools of Science. In a book which is written with the express purpose of explaining science to laymen, surely every effort should be made to create a manuscript which would be interesting to read.

The question may well be asked, "Who should write a book on science for laymen?" Should it be a journalist such as Ruth Moore who specializes in science writing, or should a scientist be diverted from his research to do it? While there may not be a generally applicable answer to this question, one of the main justifications for the journalist undertaking the task is surely that he can turn the skills of his trade to the creation of an account which is not only simple, but fascinating. That Ruth Moore has not succeeded in this admittedly arduous task seems to be due primarily to her lack of effective *selection* of material, and without selection sustained interest, let alone dramatic effect, is impossible. The crux of the matter may be that *first hand* acquaintance with a field may be necessary before an author can be selective, and at the same time accurate.

In *The Coil of Life* the wisps and threads of events tend to stray off in all directions, rather than being so fashioned as to contribute to the strength of the whole.

On the other hand, Miss Moore is to be complimented for her effective use of formulas and diagrams. She also includes a bibliography so that the reader who so desires may refer directly to many of the original papers dealing with the scientific discoveries she describes. There are a few errors, such as when she states that Baeyers "intuition" that plants form sugar from formaldehyde is correct; she seems to have failed to grasp the idea that what happens in the chemical laboratory may often be quite different from what happens in a living organism. However, on the whole the book has rather few inaccuracies in facts. She indicates in her preface that she took the care to submit parts of her book for criticism and comment to some of the scientists about whom she writes, and in addition, she has obviously done a good deal of reading herself in preparation for the writing of the book.

In all the 418 pages there is no relief from the eulogy to scientific achievement and the rigorous methods recognized by science. One might almost call it a tone of reverence that seems to pervade the book, and as continuous fare it becomes not only uninspiring, but rather annoying. Could the person have any sense of humor who would write (on page 223): "For seventeen year the Morgan fly squad bred fruit flies. There can have been few times and places in scientific laboratories with such an atmosphere of excitement and such a record of sustained enthusiasm . . . "

In summary, the book gives a clear description of recent advances in our knowledge of the role of nucleic acids in living organisms. Discussion of earlier discoveries in biology is prolonged and somewhat diffuse, with the result that continuity suffers. The presentation is such that it will be the unusual layman who will have the persistence to read the book through, but the one who does will find himself reasonably well informed in this field.

—Mary Spencer
Department of Biochemistry
August, 1961

BOOK REVIEW

AFRICAN DEVELOPMENT AND EDUCATION IN SOUTHERN RHODESIA. By Franklin Parker. (Kappa Delta Pi: International Education Monographs, No. 2) Columbus, Ohio—Ohio State University Press, 1960, pp. xiv + 165, \$1.75.

In a relatively short paperback book, Dr. Parker attempts to trace the history of non-white education in the most populous territory of the Rhodesia-Nyasaland Federation. Under a grant from Kappa Delta Pi, the Honor Society in Education, the author spent one academic year in Southern Rhodesia in the preparation of this volume.

Chapters One through Three—more than one-half of the book—are devoted to a résumé of general history, nearly all of which is a synthesis of standard secondary accounts. Emphasis is placed upon the arrival and hegemony of European settlers. Complex or crucial events are given unconvincingly simplified causes; the explanation for the grant of white self-government in 1923 is scarcely reconcilable with the political situation and the major issues that then existed. There seems to have been little attempt to balance the account with the rapidly-growing literature on African personalities, indigenous customs and changing tradition. The chapter dealing with official views of African developments is largely a discussion of the emergence of conflicting attitudes among the races and their sociological applications, which are not subjects easily integrated with the main theme of such a brief study. The work is fair, within the limitations imposed by the orientation and emphasis of its sources, but it lacks both the breadth and judgment that the study of Africa is beginning to require.

In the fourth chapter, which reviews the history of African education, the book comes to the heart of its subject. Mission and government policies are reported with competence, and the sources, though nearly all official, are more extensive. One regrets that the historically-significant and proto-nationalistic movement toward schools run by African-controlled Christian splinter sects is quickly and unsatisfactorily dismissed as "pseudo-religious" (p. 70). It is neither adequate nor accurate to imply that the "odd religious teaching" and the broader influence of these "independent, spurious schools" was regulated simply by government fiat. A few pages later (p. 89), in discussing the failure of the Jeanes system of minimally-trained rural teachers, the author discusses only the shortcomings of the Education and Native Affairs Ministries. However, in both the African church and the Jeanes school, the Africans' own unofficial attitudes were immediately and historically crucial. The first case marked the development of a conscious, deliberate, im-

patient demand for more facilities and an assertion of the claim to autonomous or autochthonous advancement. Then, in reaction to the Jeanes movement, African opinion disdained and protested vehemently against the inferiorities and crudities as well as the subtler condescension which that system implied. Not until page 96, when a later period is considered, are any such African feelings mentioned, but then they are only those of the first African delegates to the official Advisory Board for Native Development.

The final chapter, dealing with education problems, is more replete with generalization than many would wish for such a specific and current issue. The introductory discussion (p. 107) of the Africans' historical and education psyche could have been more concrete, and the prognosis for multi-racial development in the new University College (pp. 110, 120) more analytical. References to the "Mau-Mau school usurpation in Kenya" (6.117) do not, because of an apparent misinterpretation of that issue, have at all the intended relevance to Rhodesian problems. The chapter, and the book, close on a truism that precludes a sense of critical stimulation.

A series of appendices present extracts from statistical records, summarize the administrative and academic structure of Southern Rhodesian education, and recount informally the events of a primary-school visitation by the author. The collected data are convenient and current. However, scholars will still have to return to the original journals and reports for the complete or documented details, and others will not find the analyses or syntheses of detail that they would wish.

Students of Rhodesian or African education will prefer to rely upon the relevant sections of more analytical, comprehensive and up-to-date works such as Richard Gray, *The Two Nations*; Thomas Franck, *Race and Nationalism*; Colin Leys (ed.), *A New Deal in Central Africa*; and Edward Clegg, *Race and Politics*. The sections of Lord Hailey's *African Survey* (revised) dealing with this topic remains most authoritative. Although these works treat larger subjects than the book under review they have the merits of providing more both of substance and of background. The general reader, who will require less of the statistical detail, will be likewise well-advised to prefer these studies which provide more critical and adequate treatment of the general historical context and the broader aspects of Federation policy within which Southern Rhodesia's current educational situation is developing.

—Donald L. Wiedner
Department of History
August, 1961

The Alberta Journal of Educational Research

Vol. VII, No. 4

December, 1961



THE COMMITTEE ON EDUCATIONAL RESEARCH
Faculty of Education
University of Alberta

ACKNOWLEDGMENT



This publication was made possible by funds granted by the Carnegie Corporation of New York. The Corporation is not, however, the author, owner, publisher, or proprietor of this publication, and it is not to be understood as approving by virtue of its grant any of the statements made or views expressed herein.

A COMPARISON OF THE COMPETENCE IN ALGEBRA OF THE GRADE IX STUDENTS OF THE EDMONTON PUBLIC SCHOOLS IN 1938 AND 1959

NORMAN D. MUIR

*Ross Sheppard Composite High School
Edmonton*

For more than a decade public education in Canada has been the object of a critical attack of unprecedented concentration. The critics have charged that the three Rs have been neglected, that curricula have been cluttered with "frills", that courses have been "watered down", that "social adjustment" has been substituted for learning, that "Progressivism" has eaten like rot into the foundations of education, and that the schools have been turning out a sub-standard product, deficient in the skills of reading, writing, spelling and calculating. On the other hand, defenders of the system, chiefly professional educationists, have denied most of these accusations, describing them as being based on ignorance, emotional thinking and unreasonable prejudice. These opposing factions have been so persistent and vocal that governments have been obliged to pay attention to them, with the result that Royal Commissions in four provinces have recently conducted the most comprehensive surveys of education ever to be published in this country (2), (3), (4), (7).

Yet little has been done by way of controlled, experimental studies to discover whether standards have indeed fallen, or have been maintained, or improved. The investigation here summarized was an attempt to obtain evidence, through sampling and testing, which might shed some light on one area of this still unsettled question.

The Problem and Hypothesis

It was the purpose of this study: (a) to compare the standard of competence in Algebra of the Grade IX students of the Edmonton public schools in 1959 with that of their counterparts in 1938; (b) subsequently to discover whether the apparent difference in competence was statistically significant; (c) to discuss some of the factors which may have contributed to a change in competence. Nineteen thirty-eight was chosen as the comparison year because it was approximately a generation removed from the year of the study, and because the students of that year had received their elementary schooling in the "pre-Progressive" era.

Hypothesis

The hypothesis tested was that *there is no difference in competence in Algebra between the Grade IX students of 1959 and those of 1938 in the Edmonton public school system, according to the measuring instruments employed (the 1938 Grade IX Departmental Examination in Algebra).*

A Brief Comparison of the Alberta Grade IX Courses In Mathematics, 1938 - 1959

The Courses of Study

Curriculum guides. There is a considerable contrast between the curriculum guides for Grade IX mathematics issued by the Department of Education in 1938 and in 1959. In 1938 the Department's directives and suggestions to mathematics teachers in the Intermediate School occupy only four pages of the 280-page *Programme of Studies for The Intermediate School* (9). Of this material, approximately one page is devoted to the Grade IX course, and of this page, a single paragraph of five lines contains the official statement of the purpose of the study of Algebra.

In 1959, however, the Department supplied a separate 44-page booklet (5) which set forth in some detail the objectives and principles of organization of the Junior High School course in mathematics, and recommended a number of methods of presentation. Chapter IV of this guide deals exclusively with the Grade IX course.

Objectives. There appears to have been little change in the stated objectives of the Grade IX mathematics course from 1938 to 1959. In 1938 the chief aim was to equip the students to interpret the environment rather than to have them spend time perfecting techniques of computation:

Many pupils will not continue their schooling beyond Grade IX. It is not desirable, therefore, to spend their time on perfecting techniques of computation which they will seldom if ever use. It is preferable to introduce them to as wide a range of interpretative mathematics as possible . . .

Since the aim of the course is to interpret the environment rather than to give skill in computation, emphasis is placed on easy mathematical relationships expressed in the form of tables, graphs, formulas and equations (Reference 9, page 120; italics in the original)

The curriculum guide for 1959 lists these objectives for the junior high school course in mathematics:

1. To develop the ability to think clearly;
2. To develop the ability to use information, concepts and general principles;
3. To develop the ability to use fundamental skills;

4. To develop desirable attitudes, especially respect for knowledge, respect for good workmanship, respect for understanding, social mindedness, open mindedness;
5. To develop a wide range of interest and appreciation (Reference 5, page 3).

The Textbooks

The textbook used in 1938 was *Mathematics for Today*, by La-Zerte and Betz (6); that used in 1959 was *Mathematics for Canadians, Book I*, by Bowers, Miller and Rourke (1). A comparison of the two books reveals a general similarity in topical content. There are, however, notable differences in treatment and emphasis, chiefly the following:

1. The 1938 book assumes a stronger arithmetic background in the students: it introduces the Algebra without preliminaries. The 1959 book, on the other hand, contains two chapters for the review and strengthening of the pupils' knowledge of integers, fractions and decimals.

2. The treatment of the fundamental operations of mathematics is more specific and formal in the 1938 book, relatively incidental in the 1959 book.

The general impression obtained from a comparison of the two books is that the pupils who used *Mathematics for Today* in 1938 must have received more practice in algebra than did those who used *Mathematics for Canadians* in 1959.

The Measuring Instruments and the Samples

The Tests

The Algebra Test. The principal measuring instrument used in this study was the 1938 Grade IX Departmental Examination in Algebra, a one and one-half hour test covering the major topics of the course. The raw scores on this test for the 1938 samples were on file at the Department of Education. The content of the test was appropriate to the 1959 course, with the exception of one question which required the division of a quadrinomial by a binomial—a topic not specifically dealt with in the 1959 textbook. It may be noted in passing that this was by no means the most poorly answered question.

An analysis of the Algebra test showed that it was a measuring instrument mainly of manipulative skills and recall rather than of interpretative ability.

The General Test. Each year during the June examinations the the Department administers to all Grade IX students a test of general ability, formerly called a General Test. The 1938 General Test

was given to the 1959 sample as well as the Algebra test, to provide a comparison of the general competence of the two groups. It was a forty-five minute objective test which required the candidates to use both verbal and computational skills in making generalizations, drawing inferences, detecting analogies, performing calculations and solving problems. It was set up for the 1959 students exactly as it had been in 1938, except that it was mimeographed instead of printed.

The Samples

The 1938 sample consisted of 203 individuals (represented by their record cards) drawn by means of a table of random numbers from a population of 1,292 students comprising thirty-five classrooms in fifteen schools. It was approximately 16 per cent of the population. The record cards supplied the following data: sex, age, birth date, I.Q., raw score in Algebra, raw score in the General Test, year's attendance, grade repeater or non-repeater, final mathematics grading and pass category.

The 1959 sample. The selecting of this sample was dictated by considerations of practicability rather than by the requirements of scientific rigor; such is usually the case in studies of this kind. Permission to carry out the necessary testing program in the classrooms was granted with the request that the administrative routine of the schools should be disturbed as little as possible, consistent with the drawing of a satisfactory sample. Accordingly, a purposive selection of six schools was made, with a view to choosing as representative a group of students as could be obtained, with respect to socio-economic status, size and type of school, and degree of departmentalization of instruction. This method of choice is supported by the opinion of Parten (8):

... the sampling procedure should be directed more toward finding and using practical devices to avoid distorted samples than toward using refined mathematical formulas to measure chance fluctuations in sampling. ... if the choice must be made between employing a logical, non-mathematical approach which might do no more than guarantee that the sample is unbiased, and using a theoretically efficient sampling design which in practice might permit the introduction of biased errors, the author believes the former is preferable.

Fortunately, a means of testing the representativeness of the sample was available through a comparison of their scores on the 1959 Grade IX Departmental Ability Test with those of the parent population. No significant difference was found between the means and standard deviations of the sample and the population.

The sample size (481 students) was relatively the same as that for 1938—approximately 16 per cent of the population.

Scoring and Test Results

An original scoring key could not be obtained for the Algebra test, perhaps because the students' solutions and answers in 1938 were written on foolscap and no matching key could be printed. Thus the writer had no alternative but to construct his own key. However, the value of each question was shown on the test paper, and there was, in the main, an obvious correspondence between the expected answers and the designated marks. It was in a few cases only that an independent assignment of marks had to be made for the respective steps in a problem's solution, and this was done with an aim to distributing the marks with appropriate relative weight among the essential steps in the solution. The writer's judgment in making these apportionments was based on many years of experience and on several terms of service as a sub-examiner in mathematics for the Department of Education.

An official key was available for the General Test. Each correct answer was worth one mark.

Summary of Results

Table I gives the mean raw scores for the two samples on the Algebra test and on the General Test. The most notable fact revealed by these figures is that the 1959 students scored higher on the General Test but lower on the Algebra than did the students of 1938.

TABLE I
MEAN RAW SCORES AND PERCENTAGES ON THE
ALGEBRA TEST AND THE GENERAL TEST FOR THE 1938
AND 1959 SAMPLES

	Algebra Test		General Test	
	Raw Score	%	Raw Score	%
Possible score	75	100	89	100
1938 Sample	31.36	42	56.49	63
1959 Sample	26.66	36	60.78	68

Tests were carried out to discover whether the difference of the population means as determined by sample statistics was significant. These tests revealed that the difference was highly significant (at the 1 per cent level) for both the Algebra test and the General Test. It was therefore necessary to reject the null hypothesis and

to conclude that the students' proficiency in Algebra in 1959, as measured by the 1938 Departmental examination, was significantly inferior to that obtaining in 1938.

Factors Affecting the Results

Measurable Factors

Of a dozen or so factors which might be expected to have a differentiating effect on the test scores of the two groups of pupils, some are measurable to a degree while others are not subject to any useful quantitative appraisal. Table II displays the measurable factors.

There is reason to believe (limitations of space prevent explanation here) that the difference between the mean IQs of the two samples was even greater than that shown in the table. This would increase the competitive advantage indicated for the 1959 group.

Factors Not Subject to Measurable Evaluation

Subject-matter difference reflected in the test paper. It was mentioned above that there was one question on the Algebra paper of a type not dealt with in the 1959 textbook—the division of a quadrinomial by a binomial. An estimate was made of the increment to the aggregate score of the sample on this item which would probably have occurred if the students had all been prepared for it (some apparently had been). This estimate was based on the marks earned on a question of the inverse type, and was deliberately made quite liberal. The result would have raised the mean score about one half mark—certainly not enough to affect the significance of the difference of the sample means.

Another point is worthy of mention with respect to the difference of the mean scores. In 1938 it was the policy and practice in scoring all Departmental examinations to deduct marks for errors in spelling and language usage (Reference 9, page 14). No such deductions were made from the scores of the 1959 students. Hence in respect of any change of marks which might have resulted from language errors, the 1959 mean score was, if anything, higher than if the papers had been scored in 1938.

End-of-term review. It might be presumed that the extra seven or eight days' pre-test review enjoyed by the 1938 group (the 1959 students wrote the test on the 12th of June) might have contributed to their higher mean score. However, it is not likely that more than half of this extra time was spent on Algebra, the other half being spent on Geometry, in which there was a separate examination. Moreover, the attendance figures in Table II show that the effective

TABLE II
FACTORS, MEASURABLE IN SOME DEGREE, WHICH
WOULD BE EXPECTED TO INFLUENCE THE TEST
SCORES OF THE TWO SAMPLES

PART A			
Item	1938 sample	1959 sample	Expected effect
Mean I.Q.	102	109	+
Mean age	15 y. 4 m.	15 y. 1 m.	
Mean attendance	173 days	188 days	+
Mean class enrolment	37	29	+

PART B
QUALIFICATIONS OF TEACHERS

Item	1938	1959	
Number of teachers teaching Grade IX mathematics	11 (all schools)	12 (sample schools)	
B.A., B.Sc., or B.Ed. degree	4	9	
B.Ed. and a second bachelor's degree	0	2	
M.A.	1	0	
B.A., M.Sc.	1	0	±?
No Degree	5	1	
First Class or Professional Certificate	11	10	
Junior E (perm.); Standard S (interim)	0	2	

length of the school year was about two weeks less in 1938 than in 1959. It is improbable that this loss of normal instruction time would be more than made up by three or four days' final "cramming".

Change of emphasis in the teaching of mathematics. Officially the stress in mathematics instruction for the whole period from 1938 to 1959 was explicitly *not* on techniques of computation. But in 1938 this was a new philosophy. Both teachers and pupils had

been accustomed in the elementary school to regarding speed and accuracy in computation as a desirable goal, and to the use of drill to attain it. The inertia of this tradition must have carried it forward for some time. By 1959, however, the diminished emphasis on manipulative skill had had time to become incorporated into teaching practice, particularly by younger teachers who had themselves been students during this period. Moreover, the textbook used in 1959 was much more in line with the philosophy of the curriculum than was the more formal older book. Thus it seems likely that in practice there was less emphasis on manipulative proficiency in 1959 than in 1938.

Relative selectness of the populations. The net loss by drop-outs and transfers between October and June in 1938 was about 3.7 per cent of the Grade IX population; in 1959 it was about 4.1 per cent. Apparently the drop-out rate had not decreased. Further, the mean IQ in 1959 was higher than in 1938, according to the available records. The indication is that the 1959 students were not a less select group than those of 1938.

Sociological factors. It is commonly assumed that as a result of post-war prosperity in this country, a large segment of society has acquired a set of values which emphasizes materialism and self-achievement and the like. This attitude has been communicated to many young adolescents, so that they consider it stupid to be smart in school, and naive to be conscientious students. The Report of the Royal Commission on Education in Alberta comments on the prevalence of such negative attitudes:

No small part of a disinclination toward education may be traced to out-of-school influences—the home and society at large. In an era of affluence . . . individuals have become enamoured of immediate personal benefits and self-interests . . . A long series of undesirable “public” practices and attitudes are put on exhibition to school youth . . . Many young people who leave school prematurely have succumbed to influence directed at them while they were still in school. There is evidence that many complaints from employers originate in this group, whose achievement is grade X or below and whose attitudes partially reflect those of society. (Reference 2, page 41).

Certain other phenomena have appeared within the last ten years which compete with the school for the attention of the young; television and the student-owned automobile are examples. The effect of these counter-attractions on school achievement would be difficult to measure, but there is no doubt that they have helped to create an environment different from that of 1938.

Summary and Conclusions

Two main conclusions are drawn from this study:

1. There has been a significant decline in proficiency in Algebra

at the Grade IX level in the Edmonton public schools since 1938.

2. The present (1959) level of proficiency in Algebra in Grade IX is regrettably low, as measured by the 1938 Departmental examination. This verdict is based on the fact that the mean score of the 481 students who wrote the test was 36 per cent, and also on the fact that the most frequently occurring score for the majority of the test questions was zero.

The study revealed that the 1959 students possessed several advantages over the 1938 group:

1. They were brighter. This is indicated both by their higher mean IQ and by their superior showing on the General Test.
2. Their school attendance was better (188 days vs. 173 days).
3. The pupil-teacher ratio in their classrooms was considerably lower (29:1 vs. 37:1).

These advantages should have enabled them to turn in the better performances on the Algebra test. That they did not do so seems to be attributable to the following factors:

1. A curricular shift in emphasis from computational and manipulative proficiency to other aspects of mathematical learning such as the interpretation of the environment, the grasping of concepts and generalizations, the development of logical thinking and of the ability to analyse problems, and the gaining of interests, appreciations and good attitudes.

2. Although the courses for the two years were topically similar, the 1938 course contained a much larger quantity of exercise material; it therefore seems likely that the 1938 students became the more practiced and experienced algebraists.

3. Negative community attitudes may, of recent years, have been reflected in student attitudes to a degree sufficient to cause a decline in student achievement.

Evaluation and Suggestion

In conclusion, the writer wishes to present two related questions which seem especially pertinent in the light of a projected revision of the mathematics program.

1. *Is the emphasis of the present curriculum realistic?* To the writer's knowledge it has never been demonstrated that it is possible to teach or to develop, in even the bright pupil, the basic processes of analysis and the tactics of insight which are the essence of clear thinking. Algebraic techniques can and should be taught to equip the thinker with a powerful tool, but whether the thinker himself can be produced at will is a question which still awaits an affirmative answer. Again, the development of desirable attitudes,

a wide range of interests and genuine appreciations is a worthwhile aim; but these are among the later outcomes of any study rather than among the first. The development of a useful degree of computational and manipulative skill is, however, an attainable goal at the junior level, and for the younger adolescent it may well be the best one after all.

2. *Have the main objectives of the curriculum been realized to any useful degree?* Objectives are of little use unless there is some way of measuring progress with respect to them. The main area for testing should be the area of the chief objectives. In 1938 this was manifestly not the case; the instructional emphasis was applied mostly in one direction and the measuring instrument in another. Perhaps this has been true in recent years also. If there is at present no way of ascertaining whether progress is being made in the direction of the principal aims, it would seem that either a suitable testing instrument should be devised and used or that the aims should be modified.

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AN INTRODUCTION TO THE SAFRAN VOCATIONAL
INTEREST TEST AND A REPORT OF ITS
ADMINISTRATION TO UNIVERSITY OF ALBERTA,
CALGARY, FRESHMEN (1961-62 CLASS)

by

JAMES A. STEWART

Faculty of Education

University of Alberta, Calgary

and

CARL SAFRAN

Supervisor of Guidance Services

Calgary Public School Board

The purposes of this article are twofold. The first is to introduce the reader to the Safran Vocational Interest Test which is soon to be published in an experimental form. The second is to provide a detailed analysis of its administration to a sample of 513 University of Alberta, Calgary, freshmen.

PART I

Purpose of the "S" Interest Test

The fundamental purpose of "S" Interest Test is to assist individuals to determine their vocational preferences in seven major vocational areas, namely (1) Economic, (2) Technical, (3) Outdoor, (4) Service, (5) Humane, (6) Artistic, and (7) Scientific.

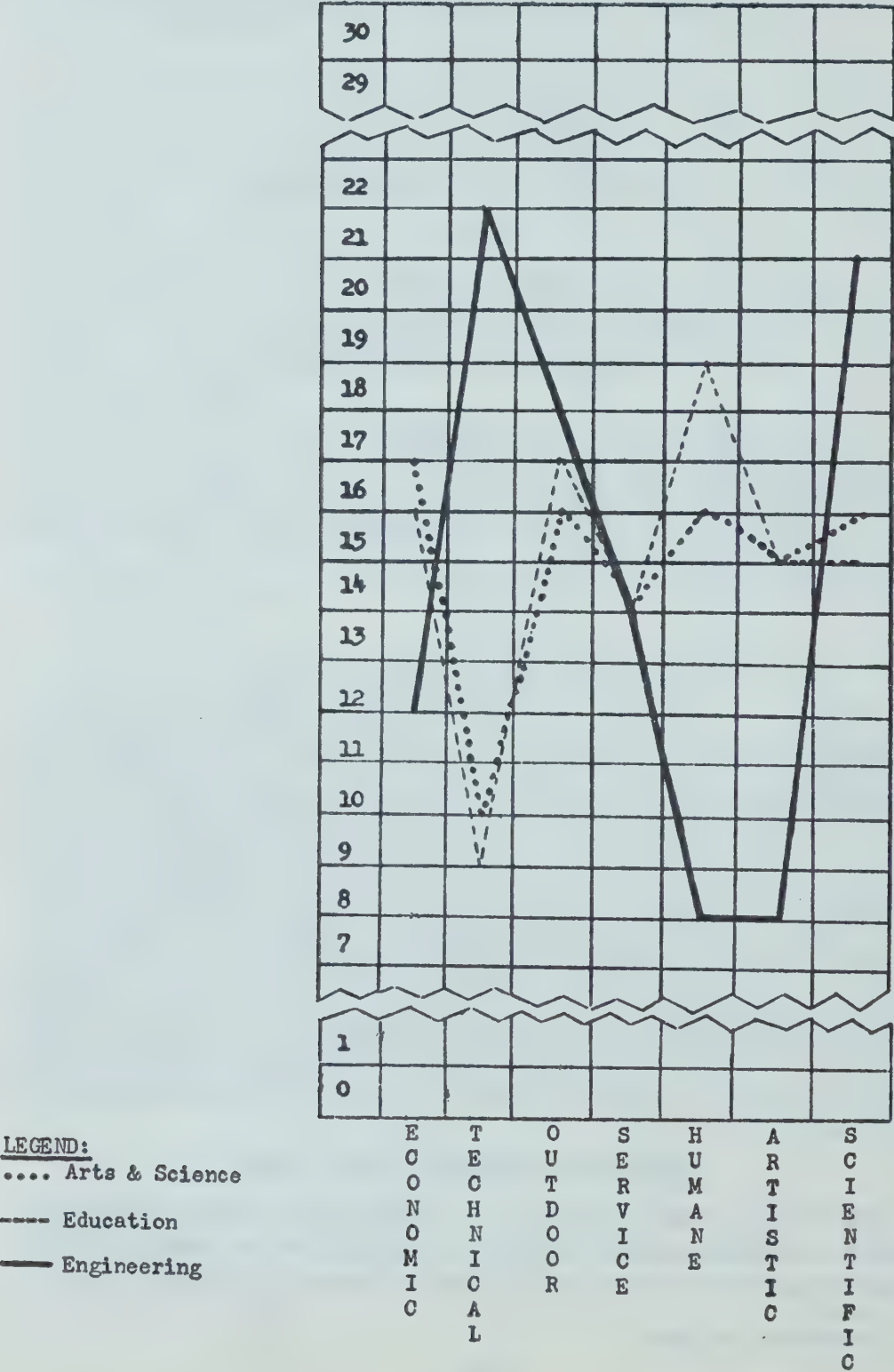
It is anticipated that the test may replace the lengthier and costlier vocational interest tests now commonly administered in Alberta High Schools. Because the "S" Interest Test has been designed to meet the known needs of Alberta students,¹ and because Alberta samples were used in the standardization steps, it should prove an especially valuable test in this Province. If Alberta school samples are more representative of other Canadian school samples than are American samples, then it should be useful elsewhere in this country.

Range and Suitability of the Test

The test has been prepared for high school seniors, University freshmen, and those other young adults who are entering pre-vocational preparatory schools. It should prove especially suited to

1. See footnotes, last page.

FIGURE 1
Median Interest Profile of Arts and Science, Education
and Engineering Freshmen on "S" Interest Test



their needs because of two noteworthy features. First, it serves as a rapid indication of vocational preferences. The individual can complete the test, score it, and sketch his profile within thirty minutes. Second, those who have administered the test during its standardization have found it can be an ideal guidance instrument. Testee involvement and concern have been maximal.

Administration of the Test

The test is self administering, self-scoring and self-profiling. It consists of 121 paired concepts similar to the following two:—

Dispensing drugs and prescriptions.

Inspecting and repairing motor cars.

Prescribing medical treatment for patients

Studying plant and animal life.

The testee must darken a circle opposite one choice in each couplet. Having done so, he enters the sub-totals at the bottom of each page and the grand totals at the end of the last page. He sketches his profile on a provided form using the grand totals as instructed. He may then be requested to complete an attached Self-Rating of Ability Scale. Finally, combining his two preference peaks and his own ability ratings, he examines the provided Occupational manual in the appropriate sections and finds a listing of general occupations that should warrant his further consideration.²

Inconsistency Check in the Test

Because the test employs a paired comparison technique it is possible to rank the items in ordered sequences from 6 to 0. If the sequence, 6, 4, 4, 4, 2, 1, 0, were to occur then there would be inconsistency in the choices made. If more than two of the five sheets indicated inconsistency, the validity of the test would be questioned.

Reliability of the Test

The test-retest coefficient of reliability on a sample of 104 high school students was .92. When the Kuder-Richardson (Guilford, 1956) Formula was applied to another high school sample of 236, reliability coefficients by interest areas ranged from .75 to .89.

In another check using the Kuder-Richardson Formula on a sample of 513 University freshmen the reliability coefficients by interest areas ranged from .85 to .98.

Validity of the Test

A review of the 121 couplets shows a high degree of content validity. Every item has been constructed in such a manner that it provides a measure of vocational preference in one of the seven designated interest areas.

TABLE I

COEFFICIENTS OF RELIABILITY FOR A HIGH SCHOOL SAMPLE (A), AND A UNIVERSITY FRESHMAN SAMPLE (B) ON THE "S" VOCATIONAL INTEREST TEST

Interest Areas	(A) r	(B) r
Economic .....	.85	.95
Technical .....	.89	.95
Outdoor .....	.78	.94
Service .....	.75	.86
Humane .....	.85	.98
Artistic .....	.89	.97
Scientific .....	.79	.85

N(A): 236

N(B): 513

When the test was administered to university freshmen, there was evidence of its empirical validity.³ Engineering students were high in Technical and Scientific interests and Education students were high in Humane interests. Other researchers have reported similar findings. (Strong, 1943), (Kuder, 1953), (Super, 1949).

Congruent validity was evidenced by correlating the corresponding areas of the "S" Interest Test with those of the *Kuder Preference Record*, (Kuder, 1953).

The correlation coefficients have been provided in Table II. All coefficients are positive and the range is from .20 to .70. The Technical-Mechanical and the Outdoor-Outdoor areas have the greatest positive relationship. There is no Kuder counterpart to the Service category on the "S" test.

TABLE II

CORRELATIONS BETWEEN "S" INTEREST AREAS AND CORRESPONDING KUDER INTEREST AREAS FOR A SAMPLE OF HIGH SCHOOL GIRLS (A), AND BOYS (B)

"S" Interest Areas	Kuder Interest Areas	(A) r	(B) r
Economic	Clerical .....	.53	.20
Technical	Mechanical .....	.70	.60
Outdoor	Outdoor .....	.44	.52
Humane	Social Service .....	.51	.32
Artistic	Artistic .....	.28	.33
Scientific	Scientific .....	.36	.33

Norms for the Test

Table III provides norms for a sample of Grade XII boys. Norms are also available for Grade XII girls; and for university freshmen, dichotomized for men and women and divided into Arts and Science, Engineering, and Education categories.

TABLE III
PERCENTILE NORMS BY AREA OF VOCATIONAL INTEREST
FOR GRADE 12 BOYS ON THE "S" TEST

PERCENTILES BY INTEREST AREA							
Raw Score	Economic	Technical	Outdoor	Service	Humane	Artistic	Scientific
30							
29							
28		90					
27							
26		80					
25		70	90				90
24			80				
23	90	60					80
22		50	70				70
21			60	90			60
20	80		50		90		50
19		40					
18			40	80		90	
17				70			40
16	70	30	30	60	80		30
15	60			50			
14			20		70		
13		20	10	40			20
12	50			30	60	80	
11	40						10
10				20	50		
9	30	10		10		70	
8					40	60	
7	20				30	50	
6							
5	10				20	40	
4						30	
3					10	20	
2							
1						10	
0							

N=136

PART II

Administration of "S" Interest Test to U.A.C. Freshmen

The sample for this study was 513 first year University of Alberta, Calgary, students. The students were registered in the Education, Engineering, and Arts and Science faculties. In the sample there were 144 Bachelor of Education students, consisting of 93 females and 51 males; 124 Junior Elementary Education students, consisting of 92 females and 32 males; 62 arts and Science students, consisting of 39 females and 123 males; and 83 male Engineering students. The sample represented 94% of the Bachelor of Education freshmen; 99% of Junior Elementary students; 70% of the Arts and Science freshmen, and 83% of the Engineering students. Collectively, the sub-groups represented 84% of the total 1961-62 class freshmen.

Testing and Procedure Followed

Two Faculty of Education psychologists administered the tests during a two week period in October.⁴ The tests were administered in regularly scheduled classes of required freshman courses. Student co-operation was requested by providing a verbal explanation of their role in the standardization procedures. Furthermore, their co-operation was sought by assuring them of anonymity of response and by informing them that they could have their interest profiles privately interpreted by one of the psychologists. The attentiveness of each student while completing his inventory supported the assumption that proper rapport between tester and testee had been established. There were only 18 non-usable inventories returned. Only one instance of "faking good" was suspected.

Processing the Data

Although the inventory was self-scoring and self-checking and although the students had to complete the arithmetic calculations before graphing their interest profiles, the researchers had all the scoring and calculations re-checked. When the researchers were convinced that the inventory was usable, the raw scores from interest category were transferred to student class lists. The data were then prepared for processing by the LGP 30.

The data were punched on Friden Flexowriter tape. In accordance with the instructions of the Adam's program, "Intercorrelation of Three-Digit Variables", the program consisted of two routines. The first generated "the normal matrix" of a set of m observations of n variables. The second part calculated from this matrix for each pair of variables, the regression of coefficients, the correlation coefficients, arithmetic means and standard deviations.

Tables were prepared from the output forms of five tapes run on the LGP 30 by Mr. W. S. Adams, University of Alberta, Edmonton, Computing Centre.⁵ The tables show intercorrelation matrices, standard deviations, and means for freshmen, Bachelor of Education, Junior Elementary Education, Arts and Science, Engineering, and total freshmen groups respectively. Data for the latter group appear in Table IV.

TABLE IV

INTERCORRELATION MATRIX, STANDARD DEVIATIONS, AND MEANS FOR ALL* U.A.C. FRESHMEN AS MEASURED BY THE SAFRAN VOCATIONAL INTEREST INVENTORY

Interest Areas	INTEREST AREAS						
	E	T	O	Ser.	H	A	Sc.
Economic	1.00	-.26	-.49	.21	-.11	-.08	-.08
Technical		1.00	.13	-.03	-.36	-.36	.10
Outdoor			1.00	-.26	-.01	-.13	-.04
Service				1.00	-.17	-.20	-.26
Humane					1.00	.02	.00
Artistic						1.00	-.31
Scientific							1.00
Sigmas	6.62	7.40	5.28	5.02	6.30	6.85	4.73
Means	15.22	9.67	17.38	14.29	17.71	15.60	14.96

*N = 513 (1960-61 Class) (Male = 289; Female = 224)

Note: r's exceeding .09 (either positive or negative) are significant at the .05 level.

The senior author calculated the statistics of differences of means and standard deviations between each group of freshmen and each other group. Estimates of standard deviations were calculated and one-tailed tests of significance were made. Significant probability values ranging from .05 to .005 were found and indicated by appropriate subscripts. A sample is shown in Table V.

General Findings

Detailed examinations of the intercorrelation matrices resulted in the following findings:—

1. There were negligible, slightly positive or fairly substantial, negative intercorrelation between the interest areas. In general these findings supported logical expectations. It was concluded, therefore, that the inventory was measuring a number of mutually exclusive areas of vocational interests. Three examples of statistical evidence to support logical expectations follow:—
 - (a) It was expected there would be a positive correlation between Scientific and Technical interest areas. An examina-

TABLE V
ANALYSIS OF DIFFERENCE OF MEANS AND STANDARD DEVIATIONS BETWEEN U.A.C.
FRESHMEN ENGINEERS, ARTS AND SCIENCE, AND EDUCATION STUDENTS IN INTEREST
AS MEASURED BY THE SAFRAN VOCATIONAL INTEREST INVENTORY

Classification of Freshmen	Arts and Science				Bachelor of Education				Junior Elementary			
	Diff'n of Means	t	Diff'n of Sigmas	t	Diff'n of Means	t	Diff'n of Sigmas	t	Diff'n of Means	t	Diff'n of Sigmas	t
Economic	3.80	4.15 _a	2.50	3.25 _a	3.57	4.75 _a	1.86	3.48 _a	4.50	6.23 _a	1.14	2.22 _a
Technical	9.63	9.00 _a	2.55	2.85 _a	13.38	16.34 _a	2.40	4.13 _a	15.14	19.44 _a	1.53	2.77 _a
Outdoor	.88	.80	.79	.94	1.30	1.81 _a	.81	1.59	1.90	2.82 _a	.57	1.19
Service	1.50	1.60	.93	1.18	.33	.54	.42	.97	.81	1.34	.53	1.24
Humane	4.68	4.74 _a	2.44	2.93 _a	9.04	15.67 _a	.08	.19	9.77	16.12	.08	.19
Artistic	5.48	4.95 _a	1.85	1.98 _c	7.01	8.07 _a	1.42	2.29 _c	7.92	8.79 _a	1.48	2.31 _c
Scientific	3.33	3.77 _a	1.13	1.52	5.46	9.89 _a	.86	2.19 _c	5.73	10.55 _a	.59	1.52 _c

Note: Significant Probability values of .005, .01, .025, and .05 designated by subscripts a, b, c, and d respectively.

tion of the matrices showed slight positive correlation in 4 out of 5 groups tested. The actual correlations were .20; .08; .27; —.09; and .10.

- (b) It was expected there would be a negative correlation between Technical and Humane interest areas. An examination of the matrices showed significant negative correlations of —.52, —.37, —.52, —.33, —.36 respectively.
 - (c) It was expected there would be a negligible correlation between Humane and Artistic interest areas. An examination of the matrices showed correlations of —.06, —.11, .04, —.03, and .02 respectively.
2. A number of significant interest area correlations, each significant at or beyond the .05 level were found. They were as follows:—
- (a) Economic interests were negatively correlated with Technical and Outdoor interests.
 - (b) Technical interests, with a few sub-group exceptions, were positively correlated with Outdoor and Scientific interests.
 - (c) Outdoor interests, with a few sub-group exceptions, were negatively correlated with Service, Humane, and Artistic interests.
 - (e) Humane interests, with a few sub-group exceptions, were negatively correlated with Technical and Outdoor interests.
 - (f) Artistic interests tended to be negatively correlated with interests in each of the other six areas. 26 out of a possible 30 inter-correlated were negative and of these 18 were significant at or beyond the .05 level.
 - (g) Scientific interests were negatively correlated with other sub-groups interest patterns in 20 out of 30 instances. 13 of the 20 negative correlations were significant at or beyond the .05 level. There were, however, four significant positive correlations between Scientific interests and Technical and Humane interests.

Detailed analyses of the differences of means and of standard deviations for each category of freshmen compared to each other category were computed. The analyses resulted in the following significant findings:—

1. Bachelor of Education freshmen had mean scores in Technical, Service, Humane and Scientific interest areas that differed significantly from the mean scores of at least one of the other three categories of freshmen.
2. Bachelor of Education freshmen had sigmas in Economics, Tech-

nical, Outdoor, and Humane interest areas that differed significantly from the sigmas of at least one of the other three categories.

3. Bachelor of Education freshmen were *not* significantly different in means or sigmas from any other category of freshmen in Artistic interests.
4. Engineering freshmen had means and sigmas which differed significantly from the means and sigmas of virtually every other freshmen group in all seven interest areas. Outdoor and Service interests were the two areas where a number of non-significant differences were discovered.
5. Arts and Science freshmen had mean scores that differed significantly from the mean scores of Total Freshmen in Technical, Service, Humane, Artistic, and Scientific interest areas.
6. Arts and Science freshmen were *not* significantly different in sigmas from Total Freshmen in a single interest area.

Summary

This article has introduced the Safran Vocational Interest Test and given a detailed discussion of its administration to a university freshmen sample.

Supporting statistics have been provided for the contention that the test has sufficient validity and reliability to warrant its experimental administration in other situations. Tables of Norms for high school and university freshmen samples have been prepared. A Manual of Vocations has also been designed to accompany the test.

It has been discovered that the test significantly differentiates between Engineering, Education, and Arts and Science freshmen in most of the seven interest areas. Finally, the test has proven to be an ideal guidance instrument at both the high school and the college levels. It appears logical, therefore, to conclude that any educator involved in counselling young adults who are attempting to make vocational choices should find the Safran Vocational Interest Test useful.

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FOOTNOTES

1. The data referred to were circulated by the Alberta Department of Education, and have been cited in reference (2).
2. Any reader wishing to secure a free specimen copy of the test and the Occupational Manual, is invited to do so by sending his request to either of the authors. The manual is similar to the one used with the M.O.R.S. (See reference 5).
3. Figure 1 has been prepared to give graphic support to the argument that the test has empirical validity.
4. The authors are pleased to acknowledge the co-operative support of Professor J. G. Snider, who assisted the senior author in administering the tests to the University of Alberta, Calgary, freshmen.
5. The authors are pleased to acknowledge the valuable assistance of Mr. W. S. Adams, who generously gave of his personal time to process data on the LGP. 30 in Edmonton.

ALBERTA SCHOOL BOARD POLICY HANDBOOKS

A. R. MYHRE AND H. T. SPARBY

I. The Problem

The need for some form of guidance in the formulation and revision of school board policy handbooks has often been expressed. Professional administrators have noted the need. Mort states:

One very pressing need for almost all school systems (state or local) is the creation, or overhauling in a systematic fashion, of their school codes or statements of policies.¹

The purpose of this study was to develop a list of guiding principles and proven practices that would be of value to a school board which was involved in writing or revising a policy handbook. It was assumed that such a list could be developed through an examination of present handbooks and through a survey of actual board practices involved in their writing and revision.

During the course of the study answers were sought to the following questions:

1. What type of handbook is used by rural school boards? This question attempts to focus attention on the following points:
 - (a) Physical appearance of Alberta school board policy handbooks.
 - (b) The major subject divisions, and the specific nature of policy handbook contents.
2. What procedures are followed in the organization and revision of a policy handbook? In an attempt to determine strengths of method which could be recommended to others, answers were sought to the following questions:
 - (a) What practices and principles are involved in writing policy handbooks?
 - (b) How are handbooks revised and kept up to date?
 - (c) What legal considerations are involved?
3. What reasons are given by school administrators for having a policy handbook? This question involved an evaluation of the contributions that a policy handbook has made to an administrative unit and its personnel.

II. Collection and Treatment of Data

Data were received from the following sources:

1. Related literature.
2. Twenty Alberta policy handbooks.
3. Professional school administrators.
4. School board members and secretary-treasurers.

All available handbooks from Alberta rural school boards and county committees were collected and analyzed. A questionnaire was prepared and used for two purposes:

¹Paul R. Mort, and Donald H. Ross, *Principles of School Administration* (New York: McGraw-Hill Book Company, Inc., 1957), p. 378.

- (a) to structure interviews with board members, secretary-treasurers, and superintendents, and,
- (b) to collect data by mail.

Since every school board was contacted, the findings of this study are based on a complete set of data from all the participating units.

III. Summary of Findings

Contents of Policy Handbooks

The twenty existing Alberta school board policy handbooks contain policies, regulations, and information on a great many subjects in the field of school administration. Subject areas included are: (a) historical background and an up-to-date description of the administrative unit, (b) duties and powers of school board members and employees of the board, (c) policies and regulations relating to pupils, (d) policies and regulations governing the "externa" of education, and (e) references to government acts and regulations.

Writing and Revising Handbooks

Although methods vary from place to place, there is a pattern of practices which should prove helpful to boards of trustees who are planning to write or to revise their handbooks.

It is generally agreed that policies are likely to be most effective if they represent the cooperative efforts of the persons affected by them. Most of the handbooks studied in this investigation were the results of committees who, directly or indirectly, involved school board members and their officers, school employees, and the public.

Two legal considerations stand out in the formulation of codified policy. First, all policies and regulations of a school board must be in accord with provincial statutes, departmental regulations, and common law. In the second place, the contents of a policy handbook, to be legally effective, must be officially adopted by a motion of the school board.

The Reported Value of Codified Policy

Reports of the experiences of the twenty Alberta rural school boards who have handbooks suggest that a policy handbook can make many valuable contributions to a school system. Considerable agreement between Alberta's school administrators and American writers on the worth of codified policy is evident. The many values associated with a policy handbook appear to outweigh the few reported disadvantages. The findings suggest that school boards, their administrative personnel, and employees all benefit from a clear written statement of school policies and regulations.

IV. Conclusions and Recommendations

Two main conclusions arise from this study of Alberta school board policy handbooks:

1. The reported success of the twenty existing school board policy handbooks in Alberta suggests that every school system would benefit by having its policy in writing.
2. There is a special need for guidance in the writing and revision of school board policy handbooks.

The recommendations which follow are designed to act as a check list for school boards that are planning to write a handbook for the first time and for those boards that are revising a handbook which they already possess. Most of these recommendations are based on proven practices and guiding principles which are presently being followed somewhere in the province.

Recommendations Relating to the Contents of a School Board Policy Handbook

The school board policy handbook, as an instrument of local educational philosophy, should be designed to meet the special needs and expectations of the community. Since communities are unlike one another, (e.g. physically, economically, and culturally), school policies and regulations, in responding to a variety of conditions, will probably be different in detail. For this reason, policies and regulations should be developed locally. Handbook statements from other administrative units may not be entirely effective or acceptable if they are adopted in a new setting.

The following list suggests various sections of information and policy which handbooks may include.²

1. *Preface:*

- (a) The preface should include a statement of the educational philosophy and the objectives of the local school system.
- (b) Written into the preface should be the plan for revising and keeping the handbook up to date.
- (c) An acknowledgement of those who helped to write the handbook may also be included.

2. *Descriptive Features of the Administrative Unit:*

- (a) A short historical account of the administrative unit may be included for background.
- (b) A description of the present administrative unit and its operation should be given for the orientation of new board members and school employees.
- (c) A listing of administrative personnel, including their phone numbers and address has been found useful.
- (d) Educational associations that are active in the community may also be described very briefly.

²A suggested table of contents for a policy handbook appears in Appendix A of this study.

3. *Duties and Powers of Administrative Officers:*

The duties and powers of the following administrative officers should be clearly defined in writing:

- (a) School board members.
- (b) Superintendent of schools.
- (c) Secretary-treasurer.
- (d) Supervisors of instruction.
- (e) School principals and assistants.

4. *Administrative Policies Affecting Teachers:*

Statement of policy and information governing a teacher's conditions of employment and responsibilities should be recorded.

5. *Administrative Policies and Regulations Relating to Pupils:*

- (a) A policy handbook should state board policies and regulations which may assist principals and teachers in the management of student-school affairs, (e.g. policy on attendance).
- (b) Information of interest to pupils, such as lists of scholarships and awards, may also be included.

6. *Administrative Policies and Regulations Relating to Non-Professional Employees:*

The duties and lines of responsibility of the following school employees should be clearly outlined:

- (a) Bus drivers.
- (b) Clerical assistants.
- (c) Custodians.
- (d) Maintenance foremen.

7. *Administrative Policies and Regulations Relating to School Buildings and Equipment:*

- (a) Regulations controlling the rental and care of school buildings and equipment by outside groups should be recorded in the policy handbook.
- (b) School board grants for school equipment and student activities should be stipulated.

The policy handbook must be comprehensive in coverage in order to act as a complete guide on the administrative affairs of the school system. In addition to what is suggested above, a handbook might contain pertinent quotations and/or references to provincial laws. Preferably, these should be compiled together into one section of the handbook. Paraphrasing provincial laws and regulations and removing sections out of context are questionable practices. Where lengthy sections of provincial statutes are pertinent, reference to them is preferable to long quotations.

Recommendations Relating to the Formulation and Revision of a Policy Handbook

This section of the study attempts to bring together some guiding principles and practices that have proven successful in writing and revising policy handbooks. Outlined below is a suggested course of action which a school board might follow in writing a handbook:

1. A steering committee of about five persons should be appointed to pilot the policy handbook through its formulative stages. This committee could include a school board member, the superintendent, the secretary-treasurer, a principal, and a teacher.
2. A tentative table of contents and a system for enumerating items should be drawn up by the steering committee. These should be reviewed by the principals' association and then referred to the school board for approval.
3. Committees of principals should be set up to develop certain sections of the handbook. Some attempt should be made to involve other employees who are directly affected by the policies.
 - (a) A review of school board minutes has proven helpful in locating policies which are still in effect.
 - (b) The style of writing used in a handbook should be clear and understandable to everyone who will be reading it.
 - (c) An attempt should be made to avoid the inclusion of temporary notices and pedagogical materials that are better handled by a superintendent's bulletin or by an instructional handbook.
4. The steering committee should review each section as it is completed in first draft, and forward it to the school board for approval. Any changes that are necessary should be returned to the committee that did the original writing.
5. After all sections receive school board approval, the handbook should be proofread by some competent person who is familiar with board policy. The superintendent should review the statements of policy in terms of their legality. Any questionable items should be sent to the Department of Education for a ruling.
6. The handbook should be printed on an office duplicating machine, bound in looseleaf type binders, and submitted to the school board for its official adoption:
 - (a) The committee should plan for a system of paginating the handbook which allows for the addition and deletion of pages. Lettering each section alphabetically and starting at page one in each section has proven a satisfactory system.
 - (b) To provide greater ease in revising the handbook, some consideration should be given to placing on each page only one area of policy.
 - (c) Subject headings should be recorded in large print at the top or bottom of each page.
 - (d) A tab system or a thumb-indexing system should be considered to help a reader find a particular section in the handbook. Printing each section of policy on a different color of paper is also a helpful practice.
 - (e) The handbook should be bound with a durable cover that will withstand continued handling.
7. The policy handbooks should be widely distributed and made available to all interested persons in the community. Every school employee should have a copy. A school board might consider giving copies to community libraries and to local Home and School Associations.

The dynamic nature of educational objectives suggests that school board policy handbooks must be reviewed and revised in systematic fashion in order to keep policies and regulations up to date and in harmony with changing conditions. The following recommendations are intended: (a) to assist boards in reviewing

and revising statements of policy, (b) to help keep distributed copies of the handbook up to date, and (c) to enable school employees to be more conversant with policy changes:

1. The school board should record the adoption of a definite plan for periodic revision of its handbook. An annual revision early in the school year is suggested.
2. The board should plan an annual review of the handbook to consider the elimination or correction of outdated policies and regulations.
3. Additions and amendments to policies and regulations should be adopted by a motion of the board.
4. All interested persons and groups should keep the handbook under review and participate in the revision of policies, rules, and regulations by recommending changes to the school board.
5. A school board should keep a master copy of its policy handbook in which changes and additions can be recorded as they occur. This master copy can then be used as a guide for an annual revision of distributed copies.
6. In order to keep distributed handbooks up to date, the revised pages should be sent out to principals with instructions for the addition and deletion of specified pages. An alternative plan would be to have the handbooks delivered to the central office where the necessary changes could be made.
7. Some plan should be considered which will encourage school employees to study the policy handbook and to acquaint themselves with policy changes. A review of the handbook at an annual teachers' institute, or at school staff meetings, early in the school year is suggested.

A STUDY OF CERTAIN FACTORS RELATED TO ACHIEVEMENT IN SPELLING

BERTHA M. NEWTON
Faculty of Education
University of Alberta, Calgary

Statement of the Problem

For years the ability to spell accurately has been deemed one criterion of a well-educated person. In addition, accuracy in this tool subject has often been used as a measure of the success of the teaching methods employed in our schools. Success in teaching spelling has frequently been questioned. In spite of much research throughout the last half century the component factors in learning to spell have not been adequately assessed.

This study of factors thought relevant to achievement in spelling was undertaken for the purpose of securing for one level of learning some knowledge of the comparative importance of certain abilities and skills. To accomplish this purpose, answers to the following specific questions were sought:

1. What is the relationship between each factor found to be a component of spelling ability and spelling achievement at a given level of learning as measured in one population sample?
2. What are the contributions of the most significant of these factors to variance in spelling achievement?

Knowledge of the factors that affect achievement in spelling should provide a basis for the selection of the abilities and skills to be emphasized at that grade level in the teaching of spelling.

Design of the Study

The survey-testing method of research was employed to gather the data required to provide answers to the specific questions stated. A thorough survey* of existing research and literature was made to ascertain the various factors which had been found to determine achievement in spelling. Only intelligence and those abilities and skills found positively related to spelling ability, and amenable to instruction, were selected for study. (The term, factor, as used in the study refers to intelligence and the abilities and skills above mentioned.) Following is the list of the factors so ascertained and shown to be significant.

1. Verbal intelligence
2. Nonverbal intelligence

*A survey of the Abilities and Skills Affecting Achievement in Spelling appeared in the September issue of this Journal.

3. Visual discrimination of words
4. Visual memory
5. Auditory discrimination of words
6. Auditory memory
7. Phonetic analysis
8. Structural analysis
9. Word derivation
10. Auditory discrimination of syllables
11. Ability to spell phonetic syllables
12. Reading vocabulary
13. Reading comprehension
14. Word recognition ability
15. Knowledge of word meanings
16. Accurate pronunciation

The next step was to select tests to measure verbal and nonverbal intelligence, achievement in each specific ability, and achievement in spelling. The following standardized tests proved useful:

Lorge-Thorndike Intelligence Tests, Verbal Battery, Level 3, Form A, Lorge & Thorndike, 1954.

Lorge-Thorndike Intelligence Tests, Nonverbal Battery, Level 3, Form A, Lorge & Thorndike, 1954.

SRA Reading Analysis Test: Aptitude, Form A, (Standardization edition), Jay & Huelsman, 1954.

The Developmental Reading Tests: Silent Reading Diagnostic Tests, Form D-A, Bond, Clymber & Hoyt, 1955.

California Reading Test, Elementary, Form W, Tiegs and Clark, 1957.

Lincoln Diagnostic Spelling Test, A. L. Lincoln, 1956.

Because standardized tests did not seem to be available to measure the remaining factors the following tests were specifically constructed for the purpose:

Auditory Discrimination of Syllables

Ability to Spell Phonetic Syllables

Word Derivation

Accurate Pronunciation of Words.

This battery of selected tests and subtests was administered to sixth grade children in Calgary, Alberta. Because sixth grade children should have developed, to a noticeable degree, many of the abilities and skills required for competency in spelling, this level

of learning was considered appropriate. Moreover, if some of these children were poor spellers, there should be a variance in certain of the factors that contributed to achievement. A total of nineteen tests and subtests was administered to 498 children in grade six. Four hundred complete sets of data were obtained and statistically analyzed.

To determine the relationships between spelling achievement and the factors related to its success, the zero order coefficients of correlation and the intercorrelations were calculated by IBM machine. This information provided the answer to the first question: What is the relationship between each factor tested and spelling achievement?

To determine the contributions of the most significant of these factors to variance in achievement, it was necessary (1) to determine the contribution of the combined sixteen factors, (2) to select from these factors a combination which would predict achievement with maximum efficiency, and (3) to calculate the amount contributed to variance in achievement by each of the selected tests. The coefficient of multiple correlation, R , indicated how accurately a given combination of variables predicted the criterion, or the extent to which achievement could be accounted for by the sixteen factors evaluated, or any given group of these factors.

To compute multiple R , the Wherry-Doolittle test selection method was used. This procedure (1) selected those tests which yielded a maximum multiple correlation, R , with the criterion test, (2) calculated the multiple R after the addition of each test, stopping when the addition of a new test contributed nothing more, and (3) computed a multiple regression equation from which the criterion could be best predicted (1:404). The calculations for the Wherry-Doolittle test selection method were done in the Computer Center at the University of Missouri. The results obtained, multiple R^2 's, were expressed in terms of beta coefficients. The substitutions in the formula for R^2 (1:396) yielded the contribution to variance that this team of tests made to achievement. In addition, each of the separate terms of the equation gave the contribution to variance which each test made to the criterion. The amount contributed to variance in achievement by the joint action of the sixteen factors as well as the amount contributed by each of these factors were determined in this way. Similarly, the amount contributed by the combination of selected factors and each of the factors which predicted achievement with maximum efficiency was computed. This information answered the second question stated: What are the contributions of the most significant of these factors to variance in spelling achievement?

Summary of Significant Findings

The analyses of these data revealed certain significant findings for the sixth grade level of learning in relation to each of the questions presented in this study.

The first question for study was stated as follows: What is the relationship between each factor found to be a component of spelling ability and spelling achievement at a given level of learning in one population sample?

The significant findings with respect to degrees of relationship obtained may be summarized as follows:

1. The coefficient of correlation obtained between achievement in spelling and verbal intelligence was .68, the highest correlation between spelling achievement and any of the selected factors studied; for nonverbal intelligence it was .39.

2. The coefficients of correlation obtained between achievement in spelling and each of the selected reading and word analysis abilities studied ranged from .51 to .63. All the correlations in this group were substantial. Specifically, these relationships were as follows:

Spelling phonetic syllables .....	.60
Phonetic analysis .....	.63
Reading comprehension .....	.63
Reading vocabulary .....	.61
Word derivation .....	.60
Word recognition .....	.55
Accurate pronunciation .....	.51

3. The coefficients of correlation obtained between spelling achievement and the visual abilities studied were lower than those between spelling achievement and the reading and word analysis abilities as a group. Although one correlation was considered low, the others were substantial. They ranged from .38 to .44. Specifically, these relationships were as follows:

Visual memory .....	.44
Visual discrimination .....	.40
Structural analysis .....	.38

4. The coefficients of correlation obtained between spelling achievement and the selected auditory abilities were lowest of all, ranging from .24 to .36. Although these correlations were considered low, they were not low enough to be considered negligible. Specifically, these relationships were as follows:

Auditory discrimination of syllables .....	.36
Auditory memory .....	.35
Auditory discrimination .....	.24

5. Substantial correlation coefficients were obtained among the several language arts abilities studied. Representative examples of these relationships follow:

Word derivation and reading comprehension .....	.68
Spelling achievement and phonetic analysis .....	.63
Reading vocabulary and word recognition .....	.58
Spelling achievement and word recognition .....	.55
Spelling achievement and accurate pronunciation ...	.51
Word meanings and word derivation .....	.50
Phonetic analysis and word recognition .....	.49
Reading comprehension and word meanings .....	.46
Spelling achievement and word meanings .....	.40

The second question posed for study was stated as follows: What are the contributions of the most significant of these factors to variance in spelling achievement?

The significant findings with respect to the amounts in per cent contributed to variance in spelling achievement may be summarized as follows:

- 1. The contribution to variance in spelling achievement by the total group of factors was 71.62 per cent, or 72 per cent.
- 2. The remaining 28.38 per cent, or 28 per cent, of the variance in spelling achievement must be attributed to factors not measured in this study.
- 3. Eight of the sixteen factors were found to predict achievement with maximum efficiency. This amount was 70.51 per cent while that contributed by the total group of factors was 71.62 per cent. This group of eight factors found to contribute with maximum efficiency with the amount contributed by each were as follows:

Verbal intelligence	16.77
Spelling phonetic syllables	14.21
Accurate pronunciation	7.29
Word recognition	7.20
Phonetic analysis	7.17
Reading comprehension	6.96
Visual memory	6.54
Visual discrimination	4.37

- 4. Of the 70.51 per cent contributed to variance in spelling achievement by this group of selected factors, 16.77 per cent was attributed to verbal intelligence and the remaining 53.74 per cent to the group of abilities and skills studied.
- 5. The amount contributed to variance in spelling achievement by the ability to spell phonetic syllables was 14.21 per cent; this amount was approximately twice that contributed by any one of the other abilities and skills.
- 6. The amounts contributed to variance in spelling achievement by each of the remaining abilities and skills were approximately equal.

7. After eight of the sixteen factors has been selected to form the battery of tests for predicting spelling achievement with maximum efficiency, the addition of any one of the remaining factors produced a combination of tests which predicted spelling efficiency with practically the same efficiency. The amounts contributed to variance in spelling achievement by these different combination of eight selected factors ranged from 69.83 to 70.51 per cent.

8. Although the zero order relationships indicated that certain abilities and skills were substantially related to achievement in spelling, the amount in per cent that each contributed to variance in achievement differed greatly.

Conclusions

Within the limitations of this study, the following conclusions appear to be valid for the sixth grade level of learning:

1. The greatest single contributor to variance in spelling achievement is verbal intelligence.

2. The group of selected abilities and skills as measured in this study account for a substantial portion of the variance in spelling achievement.

3. Of the abilities and skills investigated in this problem, the ability to spell phonetic syllables is the greatest contributor.

4. A relatively large amount of the variance in spelling achievement is attributed to factors not measured in this study. Some examples of such factors are interest, motivation, and certain other abilities and skills not measured.

5. The extent to which a particular factor accounts for performance in spelling does not necessarily depend upon the relationship exhibited between that factor and achievement in spelling.

6. Spelling is a complex process involving the application of several skills and abilities.

7. A constellation of abilities appears to be related to achievement in certain of the language arts areas at the sixth grade level of learning. Spelling ability, apparently, is one of this group.

Educational Implications

Since tests have provided much of the data for this study, the educational implications which follow are based on the abilities and skills which have been evaluated by these tests. In the light of the conclusions reached, the following implications for education appear to be justified for the sixth grade level of learning:

1. In the teaching of spelling, the ability to apply phonetic knowledge to the writing of words should receive a great amount

of emphasis. The teacher should direct attention to the words that are spelled as the sounds of the letters indicate. In addition, attention should be directed to the parts of the words in which there are inconsistencies between the sounds of the phonetic elements and the symbols used to represent them.

2. During the teaching of spelling words, attention should be given to accurate pronunciation. Words such as elm, chimney, surprise, pumpkin, quiet, and height, which are habitually mispronounced, or carelessly spoken, should be clearly and correctly pronounced.

3. When teaching spelling words, the teacher should be certain that the children are able to recognize the words they are to learn. The proper serial order of the letters should be emphasized to clear up confusions resulting from reversible word forms similar in configuration.

4. The sixth grade teacher should give specific attention to the child's growth in knowledge of phonetic analysis, or the ability to associate the appropriate sounds of the letters with their printed forms. This knowledge should include ability to recognize rhyming words, the sounds of the consonants in the initial, medial, and final positions in words, and the sounds of the vowels.

5. The teacher should give a certain amount of attention to the development of visual memory, or the ability to remember the forms of words. Special practice in writing words after a short exposure period would be useful in developing visual memory for those who are weak in this ability.

6. The teacher should also give a certain amount of attention to the development of visual discrimination ability, or the ability to detect small differences in the forms of words. Specific practice in identifying words which are similar in general form but different in meaning should be provided to develop this skill.

7. Spelling ability is a part of the constellation of skills forming the language arts. A teacher can make a marked contribution to the development of spelling ability by promoting general linguistic ability, particularly in the area of reading. The converse of this generalization would also appear to be true.

REREFERENCE

- (1) Garrett, Henry E. *Statistics in Psychology and Education*. New York: Longmans, Green and Company, 1953.

AN ANALYSIS OF LANGUAGE THEMES IN GRADE FIVE, GRADE EIGHT, AND GRADE ELEVEN

MARY GRAY
Hythe High School, Hythe

The Problem

The purpose of this investigation is to describe what the students in grade five, in grade eight, and in grade eleven may be expected to produce in their free writing. It is hoped, by comparing the work of pupils at these grade levels, it will be possible to gain some insight into the increase in skill in writing. Specifically, does the pupil in grade five write complex sentences, or is he consistently using only simple sentences? Do the pupils in these grades use such techniques as the participial phrase and the appositive to subordinate ideas of lesser importance? Does the student's writing show increased skill in varying sentences from grade to grade? It is hoped in this way to trace the linguistic development of the student and to indicate the implications for language teachers.

Specifically the purposes of the study were three:

1. To determine what can be expected of students in grades five, eight, and eleven in written themes.
2. To chart the linguistic development of the child as he progresses from one grade to another.
3. To note the implications of the study for the teachers of language.

Procedure

To collect data for the study, themes written on the open topic, "An Unusual Adventure or Experience," were collected from grade five, grade eight, and grade eleven students in the County of Grande Prairie City. All possible precautions were taken to ensure that the themes were written under the same conditions and at the same time. Three teachers from the participating schools scored each theme in the grade in which she taught, then recorded her mark on a separate sheet. Instructions were to grade the papers roughly for appearance and mechanics, then to give particular attention to expression and content. The final sample was chosen by limiting it to those themes upon which three teachers agreed on the rating. This resulted in 119 papers being chosen for analysis, viz., 40 for Grade five, 35 for Grade eight, and 44 for Grade eleven.

The analysis covered eighteen items: sentence structure (simple, compound, complex, compound-complex); loose, periodic, balanced

sentences; clauses (adverbial, noun, adjectival); sentence fragments, and run-on sentences; stylistic devices (words in series, parallelism, parenthetical construction, participial phrases, appositive). The analysis was made by counting the number of each of these constructions in each theme and tabulating the data.

Analysis

The themes of the grade five children yielded the following information about the constructions used:

1. Forty-five per cent of the sentences are simple.
2. All sentences are loose sentences.
3. Seventy per cent of the subordinate clauses are adverbial.
4. There are only a few participial phrases.
5. There are approximately thirty-seven subordinate clauses in every one hundred sentences.
6. A high proportion of the compound sentences are run-on.
7. There are approximately three sentence fragments for every one hundred sentences.

The grade eight themes indicated:

1. There are more complex sentences written than other types according to structure.
2. Forty-seven per cent of the sentences are written with subordinate clauses.
3. Most sentences are loose sentences.
4. The participial phrase is written more frequently than any other stylistic device.
5. Sixty clauses are written in one hundred sentences; thirty-six of these are adverbial, fifteen are noun, and nine adjectival.
6. There are few sentence fragments.
7. Fifty-five per cent of compound sentences contain the run-on error.

The themes from the grade eleven group indicated:

1. That grade eleven students are writing more simple and fewer compound sentences than the grade eight pupils.
2. The compound sentence is being constructed in a more concise manner; hence, the run-on error is decreasing.
3. The loose sentence is being used almost exclusively, but there is an increased use of the selective stylistic device.
4. About half the clauses in the complex and compound-complex sentences are adverbial, but the number of relative clauses

- is increasing. Not only is the noun clause being used as object and complement as in grade eight, but also as the subject of the sentence.
5. An outstanding growth in the use of stylistic devices analysed. Even though the participial phrase still has the highest frequency of use, the other devices are liberally sprinkled throughout the composition. Approximately one of these devices is used in every second sentence.
 6. Sentence fragments are infrequent and are usually due to careless omission of words.

Comparison of the Data by Grades

Comparison of Sentences by Structure

One of the purposes of the study was to compare the development of the child as he progressed from grade five, to grade eight, and then to grade eleven. In order to observe the growth in sentence structure, the percentage of each type of sentence is listed in the table below.

TABLE I
PERCENTAGE OF SENTENCES ACCORDING TO STRUCTURE
IN GRADES FIVE, EIGHT, AND ELEVEN

Grade	Simple	Compound	Complex	Compound-Complex
Five	44.9	25.1	20.9	9.1
Eight	29.6	23.4	32.8	14.1
Eleven	36.6	20.7	27.7	15.0

The writing of simple sentences decreased by almost fifteen per cent from grades five to eight, then increased from grade eight to eleven by seven per cent. Conversely, the complex sentence showed a marked increase of twelve per cent from grades five to eight, and then decreased by almost five per cent from grades eight to eleven. The compound sentence decreased by a small percentage through the grades. The compound-complex sentence increased from grades five to eight by five per cent, then decreased by a very small percentage (0.9 per cent) in the grade eleven themes. These results are contradictory to both the Stromzand study, (1924) and Frogner investigation (1939).

What accounts for the inconsistencies in our results? Do the pupils in grade eight consider that the simple sentence is an ineffective sentence and something to be avoided? Is the emphasis on

the teaching of complex sentences in the junior high school responsible? Then, in grade eleven, having crossed the hurdle of the grade nine examination, has the pupil reverted to the simpler style of writing? Or does the grade eleven student realize that the simple sentence is a good sentence and, in trying to clarify his writing, is he again using it?

Referring again to the simple and compound sentence, it appears that there may be a relationship between the writing of the simple and compound sentences in grades eight and eleven. As the frequency of the simple sentence increased, that of the compound sentence decreased. This may be because the grade eleven student is writing more concisely, simplifying his writing by using modifiers and phrases instead of using the subordinate clause. The grade five pupils write simple sentences in this way:

One day my two brothers and I were going to ride a pig.

One day I thot of training a calf.

The grade eight pupils write the compound sentence in this manner:

The Vanguard had run aground and she had broken the rudder and two of the engines.

They hurried back to the rest of the men and Jim told them about it.

The following are examples of simple sentences as written by grade eleven students:

The hard-working pioneers of yesterday did much for the people of today.

A mournful wind sprang up, flapping at the tents and howling in the pines.

When one considers the simple sentence written by the grade eleven students, it is reasonable to suppose that the two examples from the grade eight themes could have been written as simple instead of compound.

Comparison of the Use of Subordinate Clauses

Throughout the study, the adverbial clause showed the highest frequency, followed by the noun and then by the adjectival. As the pupils have more practice in writing, and gain wider experience, the amount of subordination not only increases, but also a more varied type is used. The increase in the use of the noun clause from grades five to eight is almost seven per cent, and the increase from eight to eleven is three per cent. Apparently the greatest progress in the use of the noun clause is between grades five and eight. So also the adjectival clause: it increases seven per

cent from grade five to eight, and four per cent from eight to eleven.

TABLE II
COMPARISON OF THE PERCENTAGE OF SUBORDINATE
CLAUSES IN GRADES FIVE, EIGHT, AND ELEVEN
(PERCENTAGE BASED ON NUMBER OF SENTENCES)

Type of clause	Grade five	Grade eight	Grade eleven
Noun	8.8	14.4	17.4
Adjective	2.1	9.3	13.3
Adverb	26.3	36.0	33.4
Total	37.2	59.7	64.1

The adverbial clause increased by almost ten per cent from five to eight, then declined by almost three per cent from grade eight to eleven. In grades eight and eleven the pupils are writing a greater percentage of noun and adjectival clauses; therefore, there is a decrease in the use of the adverbial clause. This is in accordance with the previously mentioned Frogner study. The present study indicated that the decrease in writing adverbial clauses is almost the same as the increase in the writing of relative clauses. This appears to indicate that as the student learns new methods of subordination, his writing of adverbial clauses decreases, and his writing of noun and adjective clauses increases.

Stylistic Devices

Table III indicates that there is an increase from grade to grade in frequency of writing of all the stylistic devices, except the appositive. The growth presents a very interesting picture as grade eight students in this study write (excepting the parenthetical construction) approximately twice as many of the selected devices as the pupils in grade five. The students in grade eleven compared with the ones in grade eight write between four and five times as many words in series, parallel locutions, and parenthetical words and phrases, and over twice as many participles and slightly fewer appositives.

The total frequency in each grade indicates that twice as many of these devices are found in grade eight themes as in those of grade five, and three times as many in the grade eleven themes as in those of grade eight.

Listing the stylistic devices written in each grade, in rank order from the highest to the lowest, also presents an interesting development. This has been done in Table IV.

TABLE III
COMPARISON BY PERCENTAGES OF STYLISTIC DEVICES
IN GRADES FIVE, EIGHT, AND ELEVEN

Categories	Grade five	Grade eight	Grade eleven
Words in Series	1.4	2.2	10.9
Parallelism	1.1	2.6	11.4
Appositive	1.1	2.3	1.9
Participial	4.7	9.0	21.2
Parenthetical	0	1.6	7.0
Total	8.3	17.7	52.4

TABLE IV
POSITION OF DEVICES IN ORDER OF FREQUENCY
FROM HIGHEST TO LOWEST

Grade Five	Grade Eight	Grade Eleven
Participle	Participle	Participle
Words in series	Parallelism	Parallelism
Parallelism and Appositive	Appositive	Words in series
	Words in series	Parenthetical
	Parenthetical	Appositive

In this analysis the participial phrase has the highest frequency in all the grades. In the grade eight themes the words in series and in apposition were written with almost equal frequency.

Summary

1. The frequency of use of the compound sentence diminished from grade five to eleven.
2. The compound sentence was poorly constructed in all the grades under study.
3. The simple sentence decreased between grades five and eight, and increased between grades eight and eleven.
4. In order of frequency of use, the type of clause followed the same pattern in all the grades: adverbial, noun, adjectival.
5. The frequency of the periodic and balanced sentences was so low as to be inconsequential in all grades.

6. Grade five students used very few of the stylistic devices studied. The use of these devices doubled in grade eight and trebled from grade eight to grade eleven.
7. The run-on sentence error was prevalent in all grades.
8. Sentence fragments decreased from grade to grade.
9. Grade eight students presented the greatest inconsistencies. They wrote the largest number of complex, periodic, and run-on sentences, and the smallest number of simple sentences.

Suggestions

1. It appears that the teaching of compound sentences could be emphasized in the grades between five and eight. That the pupil could master this is evident from the fact that greater growth in the use of clauses is shown between grades five and eight than between grades eight and eleven.
2. Since grade eleven students seem to use the participial phrase well, and since this is usually used as the modifier of the subject, it is reasonable to suppose that this could be extended to include the use of the periodic sentence.
3. The greatest growth in the use of the stylistic devices is between grades eight and eleven, with comparatively little improvement between grades five and eight. It appears that some of these devices could be taught in the grades between five and eight.

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WHEN IS GRADE REPETITION MOST PROFITABLE?

By

WALTER H. WORTH

Faculty of Education

University of Alberta

A number of elementary school children still experience grade repetition each year (4). Yet little is known about the kind of social, personal and instructional conditions under which "repeaters" may be expected to profit most. The present study seeks to provide information which may serve to guide school workers in their treatment of such slow-progress or under-achieving children.

Problem

This exploratory study sought to determine the extent to which differences in the amount of gain in achievement among students who repeat a grade in the elementary school is influenced by various social-personal and instructional variables.

Method

Subjects

The subjects of the investigation were sixty-six students who repeated the third grade in forty-five classrooms in a large urban school system in Alberta. They were divided into two groups—those who gained most and those who gained least—on the basis of an observed binodal distribution of gain grade scores in total achievement derived from the California Achievement Test, Primary, administered prior to the promotional decision and at the end of the year of repetition. The "gained-most" group consisted of twenty-eight students with a mean grade score gain of .79 and a standard deviation of .26, while the "gained-least" group was made up of thirty-eight students with a mean grade score gain of .34 and a standard deviation of .15.

Variables Observed

The influence of twenty-three variables on gain in achievement was observed. Eleven of these variables including sex, age, I.Q., frequency of choice as a desirable and undesirable work and play companion, absence, transiency, health, and home conditions were classified as *social-personal* variables. The other twelve including teacher continuity, teacher training, teacher experience, class size the use of supplementary materials in reading, language, arithmetic, and

spelling, small group instruction, individual instruction, the use of incentives, rewards, and punishments, and special treatment (e.g. referral to auxiliary services or special teachers) were classified as *instructional* variables.

Information regarding frequency of choice as a desirable and undesirable work and play companion was secured from a socio-metric test administered to all pupils in the classroom in which the subjects of the investigation were enrolled. I.Q. was measured by the California Short-Form Test of Mental Maturity, Primary. A questionnaire completed by each student's teacher, and official school records, provided data regarding the other social-personal and instructional variables examined.

Data Analysis

When the various null hypotheses of no differences between the gained-most and gained-least groups were tested, using the t-test, the Median test, and the x^2 test, the .05 level was adopted for significance in each instance. For purposes of this analysis, independence among variables was assumed.

Findings With Respect to Social-Personal Variables

Sex

The gained-most group consisted of twenty boys (71%) and eight girls (29%), while the gained-least group was made up of twenty-seven boys (71%) and eleven girls (29%).

Age

Table I shows the characteristics of the two groups with regard to chronological age. The students in the gained-most group were, on the average, four months older than those in the gained-least group. Application of the t-test revealed a statistically significant difference in age in favor of the gained-most group.

TABLE I
COMPARISON OF GAINED-MOST AND GAINED-LEAST
GROUPS WITH REGARD TO CHRONOLOGICAL AGE,
I.Q., DAYS ABSENT, AND CLASS SIZE

Characteristic	Chronological		Days Absent	Class Size
	Age in Months*	IQ*		
Mean of gained-most group	110.3	92.2	7.7	33.5
Mean of gained-least group	106.1	96.5	7.4	31.9
Standard deviation for gained-most group	6.9	10.9	10.6	2.5
Standard deviation for gained-least group	5.4	12.2	6.1	3.5
Observed value of t	+2.55	-1.75	+1.13	+1.35

(Critical value of t with 65 degrees of freedom \pm 1.67)

*As measured at the time of the promotional decision.

I.Q.

The characteristics of each group with regard to IQ is also indicated in Table I. Students in the gained-least group scored, on the average, about four points higher than those in the gained-most group. Application of the t-test revealed a statistically significant difference in IQ in favor of the gained-least group.

Health

In the opinion of their teachers the achievement of three (11%) of the gained-most group was affected by health factors (e.g. poor vision, deafness, poor diet, etc.), whereas the achievement of seven (18%) of the least-gained group was judged to be affected in this way. (x^2 test—not significant)

Transiency

Twenty-three (82%) of the gained-most group spent the entire year of repetition in the same classroom, as compared with thirty-five (92%) of the gained-least group. (x^2 test—not significant).

Home Conditions

In the opinion of their teachers the achievement of eight (29%) of the gained-most was affected by home or family conditions (e.g. health or decease of parents, economic status, sibling relationships, etc.). The achievement of nine (24%) of the gained-least group was judged by their teachers to have been affected by home conditions. (x^2 test—not significant).

Absence

As is shown in Table I, application of the t-test detected no statistically significant difference between the two groups with regard to number of days absent from school. Students in the two groups were absent, on the average, about seven days during the year of repetition with greatest variability in the attendance of the gained-most group.

Desirability as a Work Companion

Sixteen (57%) of the gained-most group were chosen by three or more classmates as desirable work companions, while sixteen (42%) of the gained-least group were so chosen. (Median test—not significant).

Desirability as a Play Companion

Among the students who gained most during the year of repetition, thirteen (46%) were chosen by three or more classmates as a desirable play companion. Among those who made least gain, fifteen (39%) students were accorded this reception by their classmates. (Median test—not significant).

Undesirability as a Work Companion

Ten (36%) students in the most-gain group were singled-out by three or more classmates as persons they would least like to work with. Eighteen (47%) students in the least-gain group were similarly designated. (Median test—not significant).

Undesirability as a Play Companion

Fourteen (50%) students in the most-gain group were listed by three or more of their classmates as persons they would least like to play with. Twenty-two (58%) students in the least-gain were so listed by their classmates. (Median test—not significant).

Findings with Respect to Instructional Variables*Teacher Continuity*

All of the gained-most group experienced their year of grade repetition with a teacher different from the one that they were with the previous year. Thirty-four (89%) of the gained-least group had the same experience. (x^2 test—not significant).

Teacher Training

Fifteen (54%) students in the gained-most group were taught by a teacher with two or more years of training, while fifteen (39%) of the least-gain group had a teacher with this amount of training. (Median test significant).

Class Size

The mean class size for the gained-most group was 33.5, with a standard deviation of 2.5. For the gained-least group the mean class was 31.9, with a standard deviation of 3.5. As shown in Table I, application of the t-test detected no statistically significant difference between the two groups.

Small Group Instruction

Teachers of nineteen (68%) students in the gained-most group reported giving them special instruction in a small group setting during the year. Thirty (79%) students in the least-gain group were given similar instruction. (x^2 test—not significant).

Individual Instruction

Teachers reported that fifteen (54%) of the gained-most group were given special instruction or assignments which required them to work separately from their classmates. Nineteen (50%) of the least-gain group were also treated in this fashion. (x^2 test—not significant).

Use of Incentives, Rewards, and Punishments

For eight (29%) students in the gained-most group their teachers

claim to have employed special incentives, rewards and punishments (e.g. progress charts, detentions, special privileges, etc.). Teachers of sixteen (42%) members of the gained-least group reported similar practices. (x^2 test—not significant).

Use of Supplementary Materials

Application of the x^2 test revealed no statistically significant difference between the groups with regard to teacher use of supplementary learning materials (materials which were not commonly provided for all pupils) in language, arithmetic, spelling, and reading. In fact, only two teachers out of forty-four reported making use of supplementary materials in arithmetic, one reported their use in language, and none reported their use in spelling. In reading, however, teachers reported using supplementary materials with 10 (36%) students in the gained-most group, and with thirteen (34%) in the gained-least group.

Special Treatment

Only two (7%) of the gained-most group and four (11%) of the gained least group were provided with any other special treatment such as referral to auxiliary services, work with special teachers, etc. (x^2 test—not significant).

Discussion

The findings suggest that two of the variables examined—IQ and chronological age—are related to differences in the amount of gain in achievement exhibited by repeaters at the third grade level. Older students of lower IQ appeared to profit more from grade repetition than their relatively younger counterparts with a higher IQ.

The fact that greater benefits from grade repetition accrue to students of low intelligence has also been observed by Steadman (3). An explanation for this may lie in the nature of the educational treatment accorded students during their year of repetition. Teachers in this investigation reported using few, if any, supplementary materials in an effort to individualize instruction at the point of error for those students who were spending their second year in grade three. As a result, the repeaters' educational program likely consisted of the repetition of partially-learned material in lock-step fashion with the rest of the class. And the lower the intelligence of a student the greater the likelihood that he will react favorably to such treatment and find it stimulating rather than boring (2). If the educational treatment of repeaters were altered, and the amount of individualized instruction increased, however, a different relationship between IQ and achievement might be noticed.

Present practice, as reflected in the marked decline in over-agedness among elementary school children in recent decades, is to promote rather than retard older students. However, the findings of this study suggest that at least some relatively older students may prosper under conditions of grade repetition. This may be due more to a maturation or rate of growth factor than to chronological age itself. Nonetheless, the results draw attention to the need for school workers to consider a student's total developmental pattern when making promotional decisions rather than simply applying some arbitrary age criterion as is sometimes recommended (1).

It is interesting to note that the gained-most group tended to be taught by the better trained, more experienced teachers. While no statistically significant relationship was observed, the difference in the sample medians were in this direction. This fact, plus just plain "common sense", indicates that whenever possible school administrators should assign repeaters to their best trained and most experienced teachers.

It is also interesting to note that the majority of the variables observed in the study appeared to have little influence on the differences in the amount of gain in achievement evidenced by students during their year of repetition. While the lack of significant relationships may simply reflect errors in measurement, it may also be an indication that these variables are not of crucial importance in influencing student performance under conditions of grade repetition. Further research is needed to determine if this is so.

Conclusions

The findings of this exploratory study give rise to the following three hypotheses or guides to action:

1. Gain in achievement among students who repeat a grade will tend to vary inversely with their intelligence.
2. Gain in achievement among students who repeat a grade will tend to vary directly with their chronological age.
3. Gain in achievement among students who repeat a grade will tend to vary directly with the amount of training and experience of their teacher.

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ATTITUDES TOWARDS TECHNICAL ELECTIVES

R. C. CARRAN AND W. H. WORTH

In an effort to meet the educational needs of a heterogeneous high school population the composite high school has emerged with technical courses included in its program. There is some evidence that the purpose for which the technical courses were introduced is not being served. They appear to be largely a "dumping ground" for students of low ability, and seldom form the basis for pre-vocational or vocational training. Moreover, relatively few students ever follow the technical route throughout their senior high school careers.

Does this apparent lack of success of the technical electives reflect the influence of certain attitudes of students, parents, and educators towards such courses? If so, what effect do these attitudes have upon the status of technical electives, student enrolment, and school policies? The present article reports on a study (1) which sought partial answers to these questions.

Purpose of the Study

The purpose of this study was to ascertain the attitudes of students and adults towards the senior high school technical electives and to determine the probable effects of such attitudes upon the shop program.

Procedure

The study was limited to the three composite high schools in a large urban school system in Alberta. The respondent groups consisted of all of the Grade XI boys attending the three composite schools in April, 1960, the total teaching and administrative staffs at these schools, and the fathers of all the Grade XI boys. To facilitate comparisons these groups were divided into a number of sub-groups. Boys were classified as "shop boys" and "non-shop boys"; staff members as administrators and/or guidance personnel, academic teachers, business education teachers, and shop or home economics teachers; and fathers as professional, managerial, industrial-technical, and others.

Data were obtained in the form of responses to twenty-one items on an opinionnaire. A total of 959 completed opinionnaires were returned, the total consisting of 564 from Grade XI boys, 125 from school staffs, and 270 from fathers. Responses to items or statements on the opinionnaire took the form of circling letter codes SA, A, U, D, SD, meaning Strongly Agree, Agree, Undecided,

Disagree, and Strongly Disagree. Each type of response for each item was given a quantitative value computed on the basis of an assumption that responses were normally distributed and presented a "typical" aggregate answer (2). Favourability, then, towards an item or a series of items was determined through the product of frequencies and response values and expressed by a score.

Findings

Scores relating to general favourability or social acceptance indicated that, of the sub-groups, only the shop and home economics teachers, the boys with shop experience, and the counsellor-administrator sub-group, evince a favourable attitude towards technical electives. The least degree of favourability is shown by professional fathers, the academic teachers, and boys with no shop experience.

Scores relating to prestige indicated that the Grade XI boys and the staff members accord the shop program favourable recognition or prestige, while the parents attach significantly less prestige to it. The only sub-groups indicating favourable prestige were, in order, the shop and home economics teachers, the administrators and/or guidance counsellors, and the shop boys. The least regard for the shop program was shown by the boys with no high school shop experience. There appeared to be an indication, too, that higher prestige was accorded the shop program for its suitability than for the difficulty or challenge involved. In other words, the challenge to students seemed to be considered inadequate in view of the nature and extent of the subject matter.

Results of the opinionnaire survey pointed to certain factors that should have a favourable influence upon shop enrolment. Boys in senior high school, according to the responses of the Grade XI boys, find the shop subjects more interesting than academic subjects. Students regard the technical subjects as sufficiently challenging to maintain interest but not so difficult as to cause undue dropout. Other results, however, pointed to certain factors that would adversely influence enrolment in technical electives. Most respondents agreed that parents do urge their sons to follow a matriculation pattern regardless of interest or aptitude. Although there was little definite support and some opposition among sub-groups regarding a policy of guiding able students towards academic subjects even if the students showed interest in technical study, the comparatively low scores of the academic teachers and administrators and/or guidance counsellors, indicated that they would tend to support such a policy. Thus there is likely a school influence as well as a home influence tending to divert able students away from the shop program. There was general agreement among respondents that the

enrolment in technical courses would increase if the program had a closer connection with further technical training. There was general agreement, too, that if these courses were represented on the matriculation program they would be as acceptable as other matriculation subjects.

Five of the opinionnaire items were used to determine attitudes towards the content of the shop courses, their vocational training value, their suitability as supplementary courses in the science and mathematics program, and their suitability as a high school offering. All sub-groups agreed that shop subjects are not "frills" that divert students from serious high school learning. The suggestions to increase the theoretical content and decrease the practical content of the shop courses brought a divergence of opinions. Boys with shop experience expressed firm opposition. Counsellors and administrators were also somewhat opposed, while shop and home economics teachers were undecided with an inclination to favour more theory. Views on the industrial-vocational value of technical electives as compared with the academic subjects were inconclusive, but there was an inclination towards favouring the academic program as a means of providing a better opportunity for industrial employment. Little support was given to the suggestion that shop courses be designed to assist in the mathematics and science fields. The proposal to remove the shop program from the senior high school to other institutions received considerable opposition from the boys, and a lesser degree of opposition from the fathers. On this issue, staff sub-groups differed widely. The shop and home economics teachers and the counsellor-administrator staff members showed disfavour. All others offered no definite support or opposition. However, general support was given the suggestion to give shop subjects matriculation status.

Conclusions

On the basis of these findings it seems reasonable to draw the following conclusions:

1. Since the opinionnaire study revealed attitudes more of indifference than of favourability towards the shop program, it appears that school boards would receive almost as much support as opposition to a proposal to remove the technical electives from the senior high school curriculum. Results of the study suggest that the group most opposed to discontinuing the shop program would be the boys in high school.

2. Groups showing least favour towards the technical electives are those having the least experience or contact with the program. These included fathers in professional occupations, teachers of academic subjects, and boys who do not elect shop subjects.

3. Although the professional literature suggests that the shop program suffers from low prestige, responses to that portion of the opinionnaire directly related to prestige did not uphold this view. Technical electives appear to the respondents to be better than "frills", and suitable in subject matter for high school study, but, according to fathers and academic teachers, somewhat deficient in challenge to students. However, since those respondents with least knowledge of the shop program showed least favour or support, it seems reasonable to infer that low prestige may be a factor influencing their attitudes.

4. Although the high interest shown by the Grade XI boys should maintain high enrolment in technical subjects, enrolment statistics indicate that enrolment is relatively low in second and third year units. The causes of this drop in enrolment include (a) the tendency for parents to urge their sons to follow a matriculation pattern, and the inclination of academic teachers, counsellors and administrators to direct able students towards an academic program, (b) the terminal nature of the high school shop program, in that the courses are not recognized as credits towards further technical study beyond the high school, and (c) the fact that technical electives are not accepted as matriculation subjects.

5. Minor recognition is given to the industrial vocational or pre-vocational value of technical electives. The respondent sub-groups considered most competent to evaluate this aspect, the counsellors-administrator staff members, and fathers in managerial and in industrial-technical occupations, appear to believe that the shop courses are of lesser value than academic courses as preparation for industrial employment. However, the opinions may be based, not only on the comparative vocational value of these programs, but also on the fact that the more able students follow the academic route.

6. A generally favourable attitude exists towards the idea of testing and classifying students for the purpose of placing them in various programs—academic, home economics, technical, and business education. Grade XI boys and administrators and counsellors, however, did not support such a streaming policy.

7. The inclusion of a five-credit shop course on the list of matriculation subjects would receive general approval, with probably as much opposition as support from the teachers of academic subjects and from the administrators and counsellors.

8. A change in the presentation of technical electives to place greater emphasis on the theoretical approach and less on the practical or project approach, would be approved by the teachers of these subjects but would be opposed by the students.

Recommendations

The findings and conclusions of this study give rise to the following recommendations:

1. An analysis should be made of the content of various shop courses and the methods and administrative peculiarities connected with the shop program in order to determine the feasibility of recognizing these courses through the Grade XII external examinations and their acceptance for matriculation. Such recognition would likely enhance their popularity with able students, increase their prestige and social acceptance, and assist in upgrading the technical program.

In connection with the foregoing recommendation, the following suggestions may have merit:

(a) Consider reducing the number of credits, or the time allotted for these subjects, from eight or ten credits to five credits as for academic courses. This would likely provide more flexibility in timetabling, extend or improve opportunities for subject choice, and accomplish an alignment with other programs of the composite school.

(b) Consider reducing the practical or project aspect so that the technical courses, especially those of the second and third year units, would be concerned largely with theory, principles, problem solving, and demonstrations. The technical courses would thus be made more specific and likely more demanding and in a better position to be included in an external examination system and in a matriculation program. However, it would be reasonable to retain sufficient practical work to enable students to develop elementary or basic skills.

(c) Investigate the possibility of placing the third year units of the technical electives on the list of "departmentals" if such external examination policy is maintained. Successful achievement in these courses could be considered prerequisite to enrolment in the technical schools of Alberta or as preferred admission qualifications. These courses, perhaps, might also be recognized as university matriculation courses in such faculties as Education, Engineering, and Agriculture. It is conceivable that such matriculation subjects could, for example, be "technology 30", a composite type technical course, or "mechanical technology 30", or "electrical technology 30".

The foregoing suggestions for a more theoretical approach relating chiefly to the second and third year units of senior high school technical electives, could apply also to the first year units. Or, in high schools where physical facilities permit, a more practical or

project type approach may be applied to first year units. The performance in the first year courses with a testing program to determine interests and aptitudes could well be a basis for counselling and the selection of appropriate courses for individual programs in subsequent years.

2. A study should be made of the effects of a change to a more theoretical presentation of technical courses. Would such approach to the study of technical courses discourage enrolment of students who show great interest in the activity or project phase of those subjects but who find it difficult to cope with technical theory and its application? Would the first year units in the various technical courses be adequate for students interested chiefly in projects or hand work? Students who cannot benefit from theoretical knowledge, or students whose interests are confined to one type of study, automotives for example, would perhaps find specific and specialized job training more to their benefit. Could this be obtained more effectively through Canadian Vocational Training and apprenticeship plans? If the more demanding theoretical study leads to improved status for the technical subjects and promotes social acceptance and prestige, would it not encourage participation by able students interested in this field of learning and serve more effectively in composite high school education?

3. Before program revision is undertaken, the purpose of the technical program in the senior high school should be reviewed to determine to what extent it should involve vocational training. Should the major purpose of the senior high school technical program be vocational, that is, should the aim be the development of skills acceptable to the trades? Or should the major purpose be to teach technical electives as a part of general education, as another field of study for development of skills, knowledges, and values, and for the avocational, pre-vocational, or practical competence of the ordinary citizen?

A number of issues are involved in a decision to offer vocational technical courses in high school. Would the vocational objective agree with an apparent major purpose of the high school to provide a fundamental education leading towards further study? Could such training programs keep aligned with constant changes in technology? Would the vocational aim in the technical program maintain or accent the present division between the academic and shop programs, thereby encouraging the view that shop subjects are not suitable for capable students? In order to establish and support classes in specific trades, would sufficient numbers of students in high school be prepared to decide on a definite vocation?

The general education function of the technical subjects may be somewhat difficult to assess. But, at least in theory, this aim or approach should lead to a closer connection with other types of courses, greater flexibility in timetabling, more substance and meaning for individualized programing, and increased participation by students with non-vocational intentions. This could mean that the technical subjects, as a recognized part of a general and broad senior high school curriculum, might be of greater benefit to more students, and might better serve the function and philosophy of the composite high school.

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BOOK REVIEW

Lawrence Cremin. *The Transformation of the School. Progressivism in American Education 1876-1957.* New York: Alfred A. Knopf, 1961.

It is gratifying to note the appearance recently of some books by historians and philosophers who through detached scholarly research try to shed light on current issues in education. For example, *The Language of Education*, 1959, by the philosopher Israel Scheffler represents an effort to clarify concepts in education by an analytic method. A different approach is used by historian Cremin in his recent book *The Transformation of the School*. Cremin traces the progressive education movement in the United States from its origin in the late 19th century, through its heyday in the 1920's and 1930's to its collapse in the 1950's.

Cremin's research leads him to the conclusion that progressive education was part of a larger social and political movement. For example, the trend to offer some form of vocational education in the schools was supported before World War I by labor groups and manufacturers' associations and was given impetus by financial support from federal government. Similarly there were community pressures to have the school broaden its program to include concern for health, family life, and civic responsibilities. The schools felt the impact of the Settlement House (e.g. Jane Adams' Hull House in Chicago) with its stress on health, social problems, and fine arts. As waves of immigrants poured into the new continent the schools were called upon to transform the immigrants with attention to health, manners and moral codes. In rural areas the movement to improve the lot of the farm population took the form of school fairs, school gardens, and nature study. Having shown the close relation existing between "social reform" and "reform of education", Cremin concludes that the community influences which sought to use the schools to carry out social reforms inevitably transformed the schools in the process.

Cremin devotes a large part of his report to the theoretical side of the progressive education movement. Some proponents of progressive education found justification for using the schools as a lever of social change in the dynamic sociology of Lester Frank Ward and in the pragmatist theories of William James and John Dewey. Others within the movement (and especially in the late 20's) advocated a "child-centered" school, presumably in accord with Rousseauan philosophy and Freudian psychology. The titles of

some of the chapters in the book indicate the range of viewpoint within the movement: one chapter is entitled "Science, Darwinism, and Education"; another has the heading "Scientists, Sentimentalists, and Radicals". Apparently progressive education was bedevilled by conflicting ideologies within the movement throughout most of its history.

Cremin tells the story of the Progressive Education Association from its beginning in 1919 to its demise in 1955. The official organ of the Association entitled *Progressive Education* ceased publication in 1957. The author suggests that the Association followed the pattern of social movements generally—through stages of initial group fervor, formal organization, institutionalization, and finally inflexibility and bureaucracy. "To what extent", Cremin asks, "did the Progressive Education Association incarnate the progressive education movement?". To ask the question, he answers, "is to ponder what the church is to religion, what the party is to ideology."

It is author Cremin's belief that progressive education helped to transform the schools, both for better and for worse—but with the good probably outweighing the harm. He concludes, "The transformation of the school was in many ways as irreversible as the larger industrial transformation of which it had been a part."

What of the progressive education movement in Canada? Has the pattern been the same as that described in Cremin's book? There is a challenge to do historical research here. Although there has never been a Progressive Education Association in Alberta, there was undoubtedly in the 1930's an educational reform movement in the Province which formed part of a larger political and social reform movement.

Canadian readers will likely find excessive detail in Cremin's book. The copious footnotes and extensive bibliographies add to the scholarly quality of the work, but will be of interest to a few only. All readers should find this book helpful in placing the progressive education movement in historical perspective.

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